

THE COMMERCIAL CAR JOURNAL

Entered as Second-Class Matter at the Post Office at Philadelphia, Pa.

New Stewart 1 Ton Truck

Bodies for
Every Business



*New Stewart 1 Ton Truck, With Body and Complete
Equipment as Illustrated, \$1185, F. O. B. Buffalo*

FOR
\$990
CHASSIS

Dealers Call It "Greatest Truck Value Ever Built"

Matches Trucks Costing \$1500 to \$1800

It has a price advantage of \$500 to \$800 over trucks of equal size and quality. Hundreds of experienced truck and automobile dealers agree it is the greatest value ever offered. Point for point it equals or excels trucks costing \$1500 to \$1800.

Check the Facts Yourself

Wheelbase, 130". Loading space 8 feet. Will exceed 40 miles per hour with capacity load. Throttle down to 4 miles. Fine appearance. Unusual gasoline and tire mileage. Electric lights, starter, electric horn, tool kit and jack. Instrument board equipped with ammeter, oil gauge, starting choke, lighting and ignition switches. Disc steel wheels—demountable rims. Non-skid cord tires 34" x 4½".

Liberal Discounts to Dealers in Small Towns

Zenith carburetor. Remy ignition starter, generator. Fuller transmission. Gemmer steering. All found in trucks costing \$1500 to \$1800.

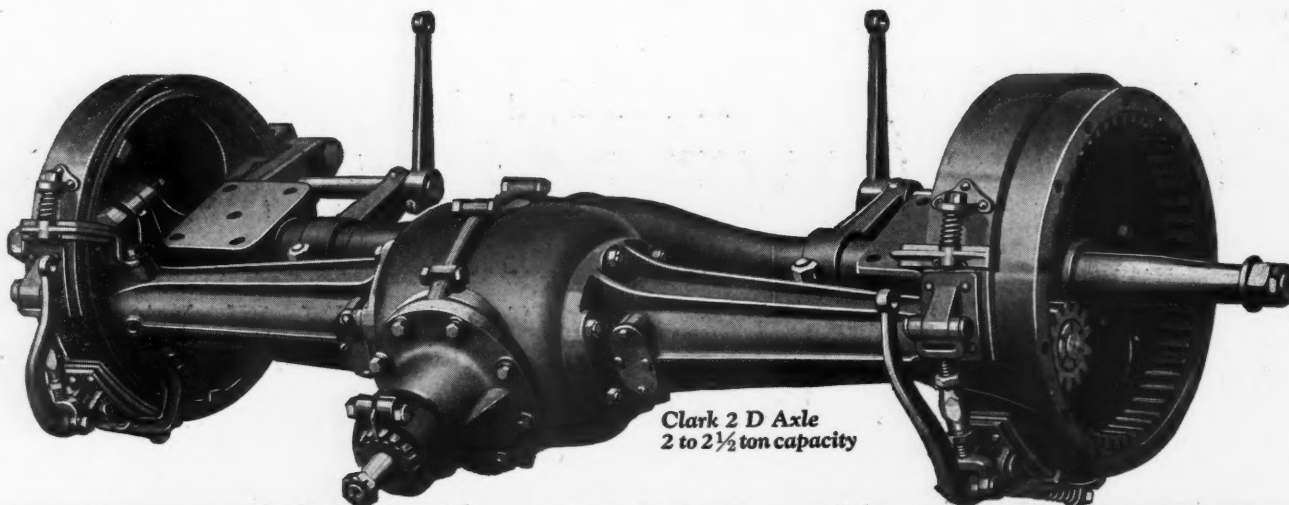
Motor—5-bearing crank shaft. Pressure feed lubricating, automatic control. Removable cylinder head and block. **Matches** motors of trucks costing up to \$1800.

Axles—Front, I-beam drop-forged. Rear, spiral bevel gear, heavy Brown-Lipe differential. All Timken roller bearings. Equal to trucks costing \$1800.

Disc steel wheels—Firestone demountable rims. Cord tires 34" x 4½". Service brake, internal expanding in 14" wheel drums. Emergency contracting type on transmission.

STEWART

MOTOR CORPORATION Buffalo N.Y.



Clark 2 D Axle
2 to 2½ ton capacity

CLARK BEVEL GEAR INTERNAL GEAR OVER HEAD DRIVE AXLES

MOTOR TRUCK dependability is determined largely by axle, transmission and engine equipment. Clark Axles are good axles: hence,

—trucks equipped with Clark Axles are known as good trucks.

Built in ten models of internal gear drive, bevel drive and "over-head" drive and in capacities from ¾ to 5-ton.

CLARK EQUIPMENT COMPANY
BUCHANAN . . . MICHIGAN



Clark steel wheel; 5-ton front for solid tires. Also built in disc for solid or pneumatic tires.

We build steel wheels for any purpose — also high-grade electric steel castings for automotive parts.

Spoke and Disc

For Truck and Bus

CLARK STEEL WHEELS

Clark Steel Wheels average over 100 lbs. per set lighter than any other steel wheel



THE PUBLISHER'S PERSONAL PAGE



Are You Selling Transportation?

OF the 275,000 motor trucks scheduled for production this year, about 45 per cent will be used to replace those vehicles which will be scrapped for economical reasons. About ten per cent of this year's production will be exported, leaving approximately 125,000 vehicles to be sold to new owners.

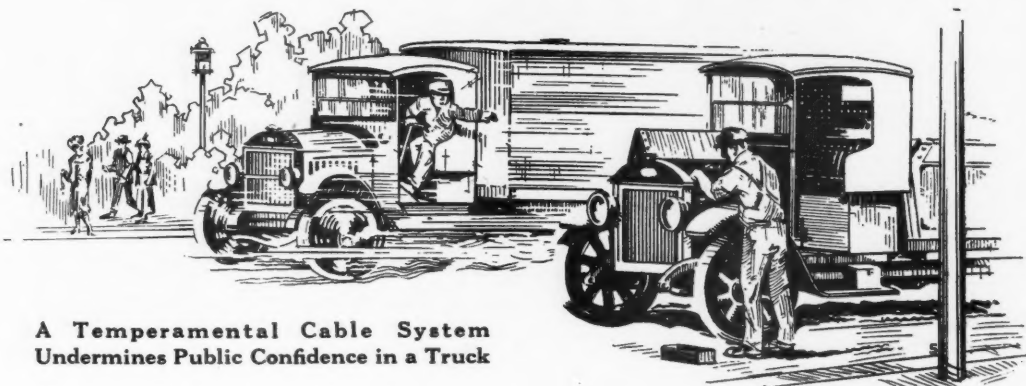
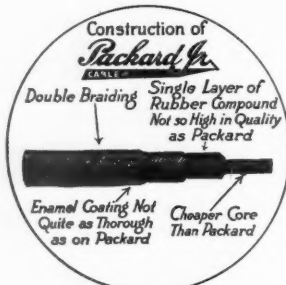
If the dealer would sell transportation from an economical standpoint and not simply sell motor trucks, he would find it possible to sell more units to new customers. Replacing an old vehicle with a new one is not selling—it's order taking. A broader vision of highway transportation is what the dealer needs.

The Electric Truck is more economical than the horse, and truck dealers who want to become transportation merchants should investigate the possibilities of the electric truck. Seventy per cent of the commercial hauling in New York City is still being done by horses.

Our observations during the past two years convince us that the electric truck field is ready for expansion. There should be more electric truck manufacturers. The gas truck manufacturer would do well by supplying his dealers with either type of vehicle so that they could sell the customer the type of vehicle most economically suited to his business. There are today over 7500 cities and towns in this country where electric current can be obtained at rates comparatively lower than gasoline, so that there is a vast field open for development.

It is for this reason that we have dedicated this issue to the Electric Truck Show, as we believe the electric truck has a proper place in the field of economical highway transportation.

Does Your Truck Enjoy Public Confidence?



A Temperamental Cable System
Undermines Public Confidence in a Truck

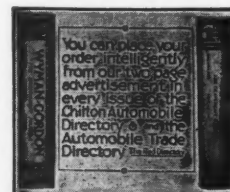
The truck-buying public judges the motor truck you sell almost entirely from what it can learn about the performance facts of your chassis assembly.

If a temperamental cable causes an occasional breakdown of a truck—the public quickly finds it out—and usually magnifies the extent of the mechanical fault.

Make sure that the cable for the Starting, Lighting and Ignition System is just as dependable as any other major chassis part—for it is one of the most vital units in service.

Specify Packard. It has been the standard automotive cable of the industry for over twenty years.

Incorporated in the specifications, Packard Cable will do its full share toward inspiring public confidence in your truck—as it does for many leading truck and car makes.



The Packard Electric Company
WARREN, OHIO

Packard Automotive Cable

||||| The Standard For Over Twenty Years |||||

Ⓢ THIS SYMBOL IN ANY ADVERTISEMENT MEANS: SEE "CHILTON Ⓢ AUTOMOBILE DIRECTORY" FOR COMPLETE BUYING INFORMATION Ⓢ

THE COMMERCIAL CAR JOURNAL

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the old as well as the new

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Authority on Circulation Audits



STANDARD CAST STEEL WHEELS

For Your Quality Motor Truck

With a big load, the motor truck, shown above, is about to travel over rutty and uneven roads. Fortunately it is equipped with STANDARD CAST STEEL WHEELS, as are thousands of other trucks compelled to constantly operate under adverse conditions.

For STANDARD CAST STEEL WHEELS are specially made of the highest grade electric furnace steel and are cast in one piece to withstand the terrific strains daily imposed on them.

Let us show you how we can build them to meet your engineers' most exacting requirements.

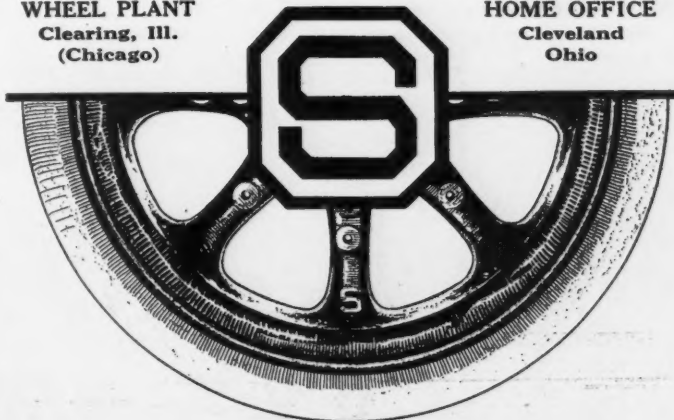
At the Good Roads Show in Chicago more trucks and road cranes were shown equipped with STANDARD CAST STEEL WHEELS than with those of any other make.

Made by

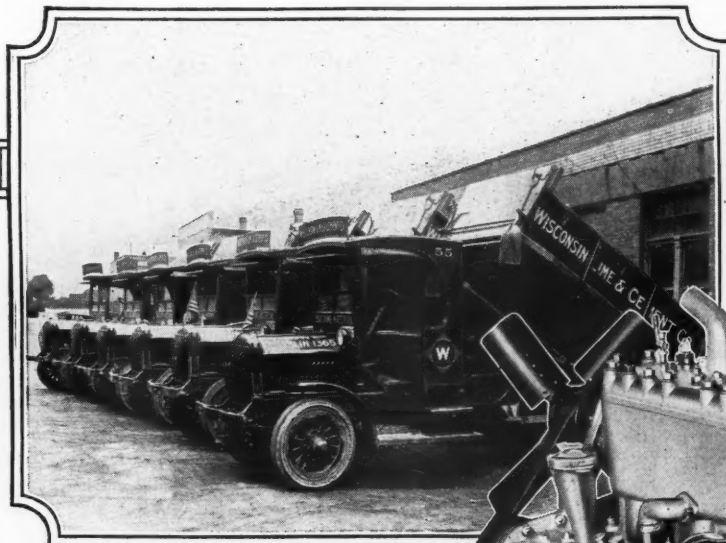
THE INTERSTATE FOUNDRY CO.

WHEEL PLANT
Clearing, Ill.
(Chicago)

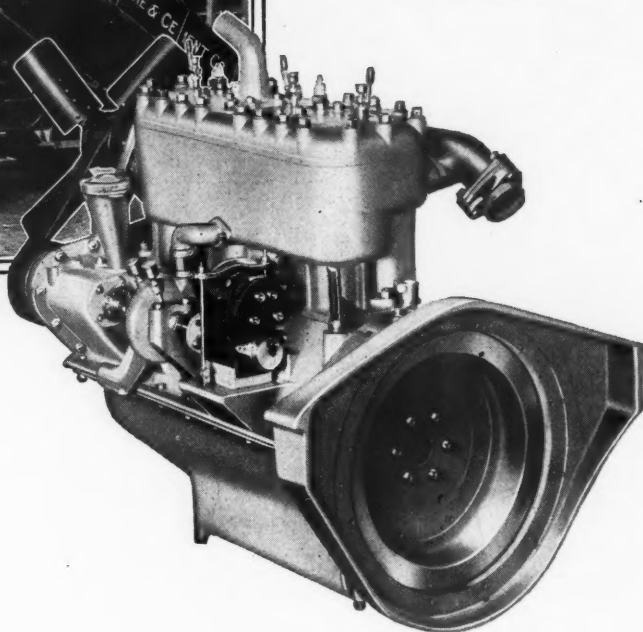
HOME OFFICE
Cleveland
Ohio



THIS SYMBOL IN ANY ADVERTISEMENT MEANS: SEE "CHILTON
AUTOMOBILE DIRECTORY" FOR COMPLETE BUYING INFORMATION



*Wisconsin Motors in
Old Reliable Trucks*



Offices in New York,
Cleveland, Chicago,
Los Angeles, Seattle.

Organized Service

If you are able to render prompt and efficient service on the trucks you sell, it's easier for you to get orders.

That is why Wisconsin Organized Service wins the approval of dealers who handle Wisconsin Motored trucks.

Our service department always has the part you need in stock.

Fast transportation from factory or branch does the rest.

Wisconsin Motors are built of the best material by skilled workmen for economy and endurance, yet they cost no more.

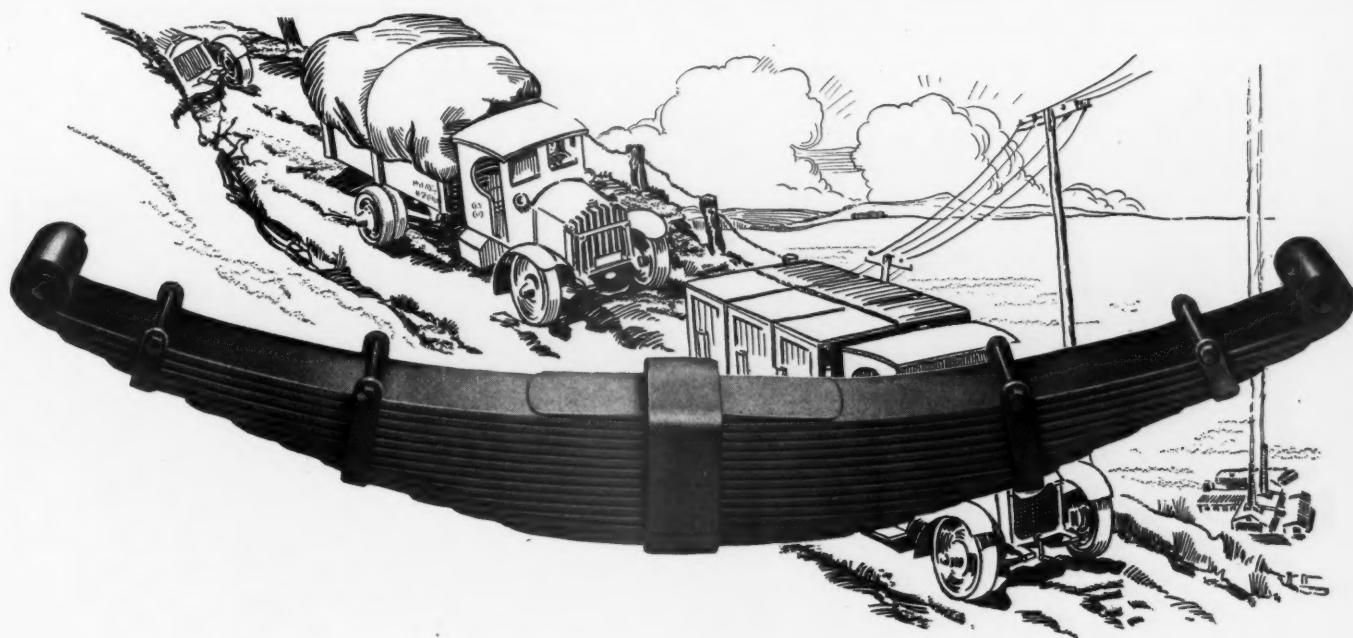
Look for them when you consider a truck agency.

WISCONSIN MOTOR MFG. COMPANY
MILWAUKEE WISCONSIN

Wisconsin

CONSISTENT

THIS SYMBOL IN ANY ADVERTISEMENT MEANS: SEE "CHILTON
AUTOMOBILE DIRECTORY" FOR COMPLETE BUYING INFORMATION



Performance-Proved Selling Assets!

Equip your chassis with Spring-Perch Springs. The acid test of performance will prove them to be real selling assets for you—and your dealers.

Since 1843 the Spring Perch Company has specialized in the manufacture of springs—made to a quality standard.

Why not avail yourself of the services of our spring experts. Send us your specifications.

Compound Springs for Bus Service—suitable for their greatly varying load conditions.

Banded Springs for Trucks—especially desirable for Hotchkiss Drive. Special designs for Speed Wagons.

SPRING PERCH COMPANY

Makers of Springs Since 1843
STRATFORD, CONN.

SPRING-PERCH

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AUTOMOBILE DIRECTORY" FOR COMPLETE BUYING INFORMATION



The International Speed Sedan Opens Up a New and Profitable Market to You

WHEN the International Speed Sedan was announced several months ago it was received enthusiastically by dealers everywhere. The reason is obvious. The Speed Sedan is an attractive, snappy, comfortable bus, especially designed for the use of golf clubs, hotels, lake resorts and all passenger lines where a better-than-average bus is required. The body is of the motor car type, upholstered luxuriously, and fitted with wide, easily-opened doors that afford quick loading and unloading. Passengers enjoy riding in this type of bus; it is a good model to sell to even the most exclusive club or hotel.

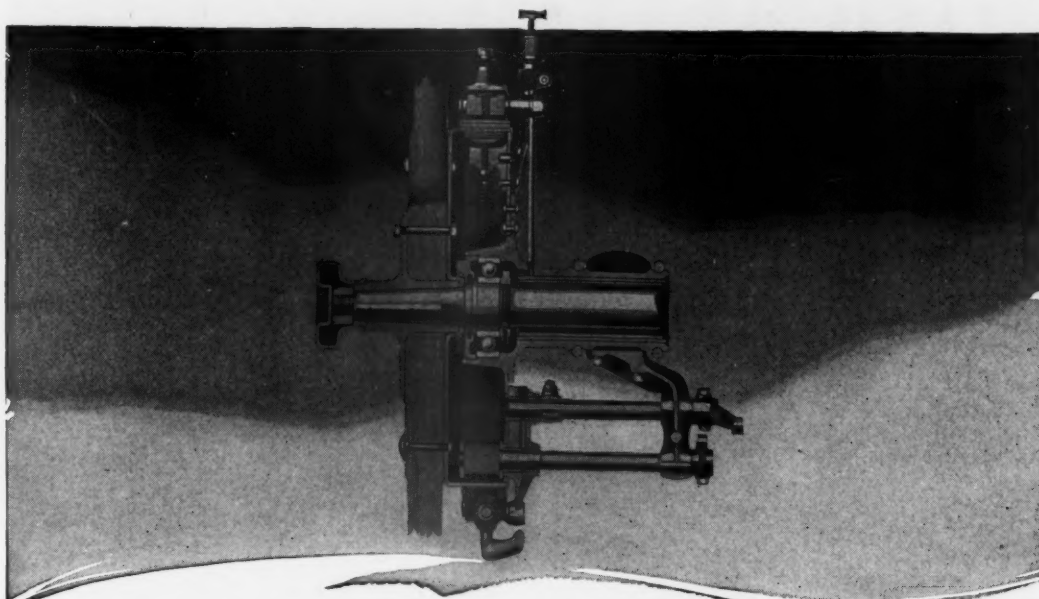
The International Speed Sedan is a part of the complete International line, which includes truck models ranging from 2,000 to 10,000 pounds capacity. There are sizes and styles for every passenger transportation or commercial hauling purpose. Many dealers are building up permanent and successful business around this line. If you are in a position to render the class of sales and service co-operation that has become an International standard, you should write at once for information regarding the contract for your territory. It may be available.

INTERNATIONAL HARVESTER COMPANY

606 So. Michigan Ave.

of America
(Incorporated)

Chicago, Ill.



Ball Bearings On Rear Wheels Take Heavy Thrusts With No Appreciable Wear

THE bearings on rear wheels must not only withstand radial loads and shocks and jars but also severe end thrusts due to side road action and skidding. Any need for bearing adjustment is the strongest evidence of inability to withstand these conditions without excessive friction and destructive wear.

With rear wheels mounted on deep-groove ball bearings made by the Hess-Bright Manufacturing Company, bearing adjustments and replacements are unnecessary as the deep, uninterrupted

grooves permit this type of bearing to carry both radial and thrust loads in combination without dissipating any appreciable power in friction and wear.

Furthermore the free easy running of this type of bearing permits of easy starting, rapid recovery and greater coasting.

Our engineering department will gladly submit plans for solving your bearing problems on rear wheels, differentials, transmissions, and other vital parts of your cars or trucks.

THE HESS-BRIGHT MANUFACTURING COMPANY

Supervised by **SKF** INDUSTRIES, INC., 165 Broadway, New York City

915



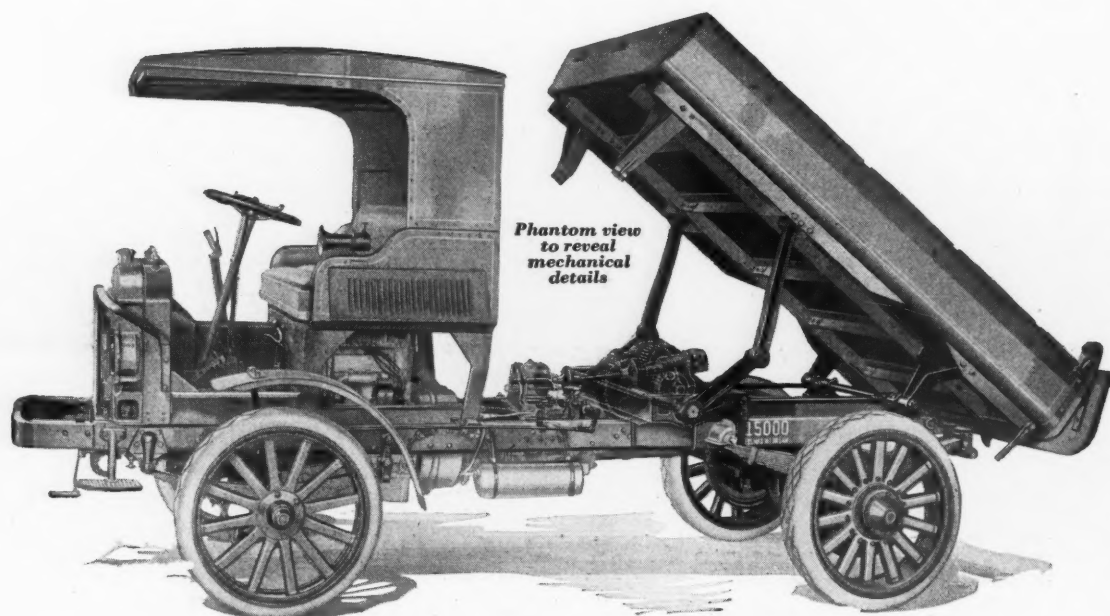
Races displaced to show DEEP-GROOVE bearing carrying maximum end thrust in a forward direction.

Races displaced to show THE SAME bearing carrying maximum thrust in reverse direction.

BALL BEARINGS
The Highest Expression
of the Bearing Principle

THIS SYMBOL IN ANY ADVERTISEMENT MEANS: SEE "CHILTON AUTOMOBILE DIRECTORY" FOR COMPLETE BUYING INFORMATION

Exclusive Autocar rotary dump



Used by more than 1300 coal men
and by

building supply dealers
contract haulers
excavators
highway builders
in all parts of the United States

The sturdy

Autocar

Wherever there's a road

The motor truck with
short wheelbase handiness
mechanical superiority
direct factory branch service

Capacities, 1 to 6 tons
Chassis prices, \$1100 to \$4350
f.o.b. Ardmore, Pa.

Manufactured by

The Autocar Company
Ardmore, Pa.

Established 1897

Branches in 44 cities

The Commercial Car Journal

VOLUME XXV

PHILADELPHIA, MAY 15, 1923

NUMBER 3



THE ELECTRIC TRUCK SHOW

HELD IN THE SHOWROOM OF
THE NEW YORK EDISON
COMPANY IRVING PLACE
AND 15TH STREET, NEW YORK
JUNE 2 TO 9, 1923, 9AM TO 8PM

NATIONAL ELECTRIC TRUCK SHOW

CONTROLLER

The function of the controller is to regulate the speed and direction of motion of the vehicle. This is accomplished by altering the amount and direction of current supplied to the motor, changing from one speed to another the pulling power of the motor is not interrupted, thus avoiding a jerk with each increase of speed. The controller on the electric truck permits its being operated at various speeds, whereas the motor on a passenger car can operate only at one speed. It contains the same units as a self-starter on a gas car.

THE MOTOR

The motor of an electric truck is nothing more than an enlarged type of starting motor as used on a gas car. It is very rugged, has but 34 parts as against over 800 parts or more in the gasoline engine. This is the power plant of the electric truck, especially designed, being fully enclosed and with a little care will last indefinitely. The bearings are of ball-bearing type and packed with grease once or twice a year will operate very satisfactorily. This motor is similar in construction and operation to any electric motor which is used in a factory or locomotive.

THE BATTERY

The battery is similar as used in gas trucks for starting and lighting only with larger units of more rugged construction, thereby increasing its reliability and useful life. Each cell of the battery is often times as large as the entire battery as used on a passenger car.

REAR AXLE

Some manufacturers use the same axle on the electric as used on gas trucks. Others use the form as followed out by their own special design, containing the same general features. Some enclose their motors instead of the gearings.

STEERING APPARATUS

Exactly the same as those used on gas trucks, all standard and well-known makes being used.

FRONT AXLE

The axles are of standard I-beam and rectangular steel tube construction, similar to those used in the manufacture of gas trucks.

WHEELS

Artillery, disk or metal wheels are used, similar in all respects to those used in gas trucks.

TIRES

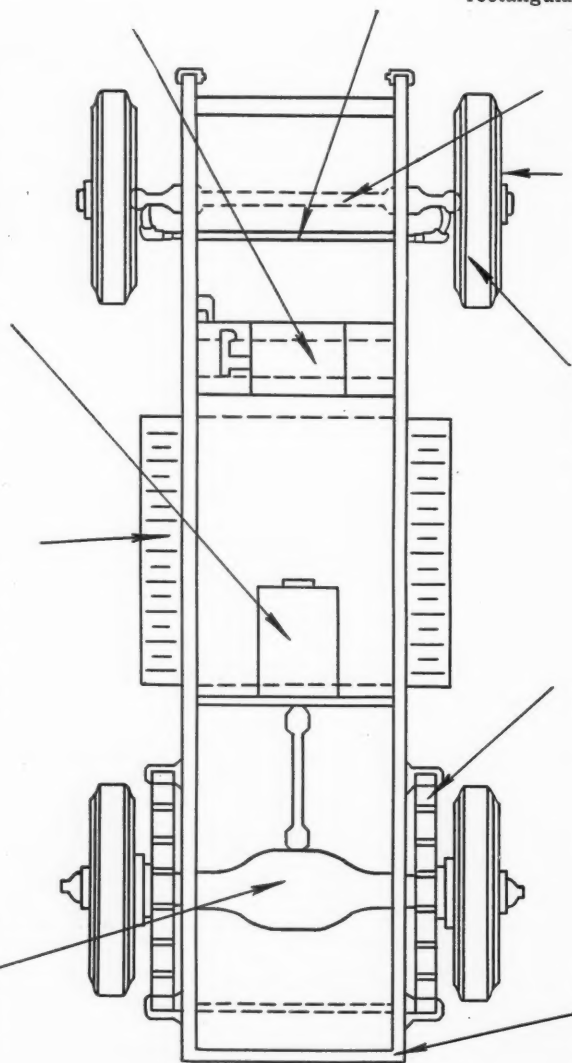
Standard sizes are used with the exception that the tires are composed of what is known as electric compound. Both solids and pneumatics are used.

SPRINGS

The springs are identically similar in all respects to gas cars.

FRAME

The frame is pressed steel or channel iron construction similar in all respects to those used in gas truck construction.

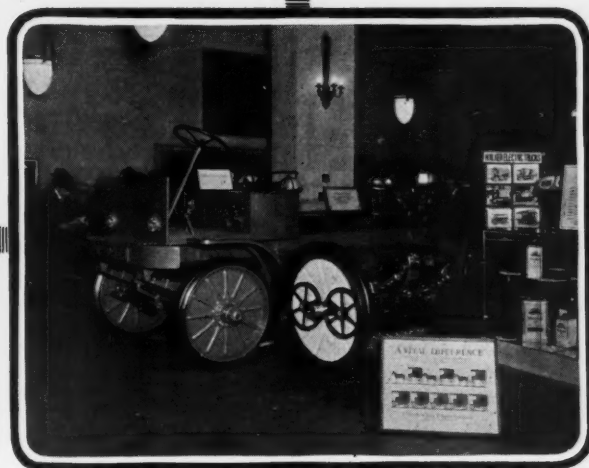
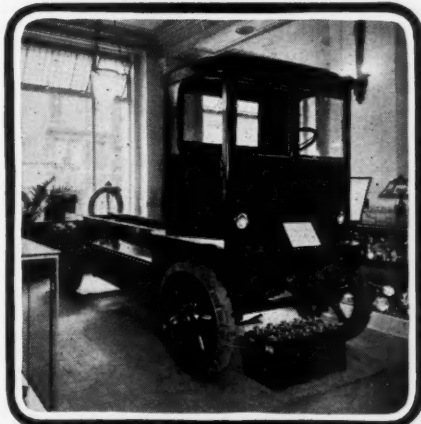


THE ELECTRIC TRUCK can be compared very favorably with the street car with the one exception, that the truck carries its own motive power and receives its power from the storage battery, whereas with the street car the power is supplied through overhead wire or through the third rail.

The storage battery is the power plant of an electric truck. It serves the same purpose as the gasoline tank of a gasoline truck and the motor which is driven by the power from the battery, replaces the gasoline engine.

It combines the qualities of strength, ruggedness and reliability, long life, high efficiency and moderate cost.

NATIONAL ELECTRIC TRUCK SHOW



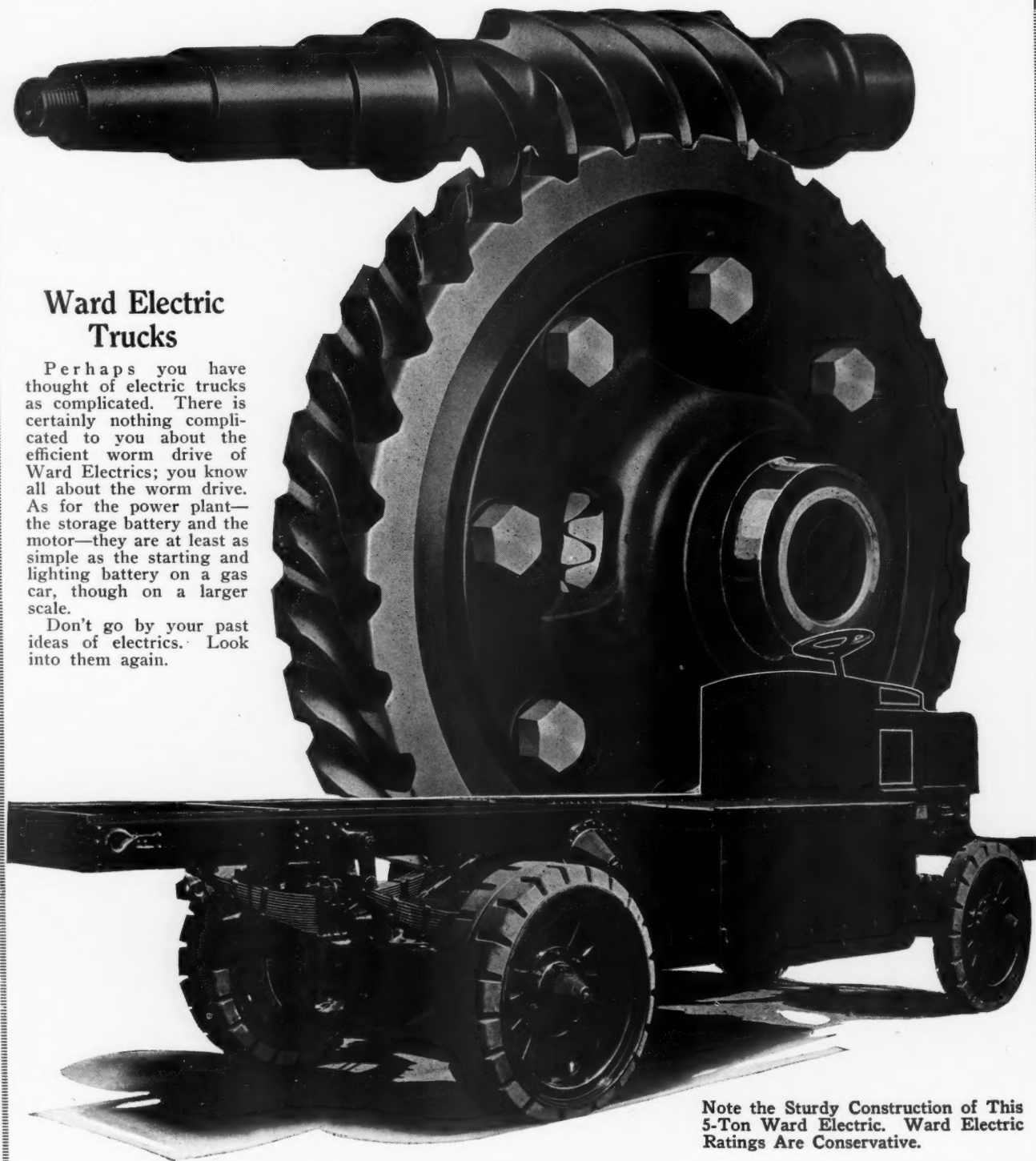
Some Views of the Electric Truck Show Held Last Year in the Showroom of The New York Edison Company

NATIONAL ELECTRIC TRUCK SHOW

Ward Electric Trucks

Perhaps you have thought of electric trucks as complicated. There is certainly nothing complicated to you about the efficient worm drive of Ward Electrics; you know all about the worm drive. As for the power plant—the storage battery and the motor—they are at least as simple as the starting and lighting battery on a gas car, though on a larger scale.

Don't go by your past ideas of electrics. Look into them again.



Note the Sturdy Construction of This 5-Ton Ward Electric. Ward Electric Ratings Are Conservative.

The Ward Electrics are worm driven; the type that is used on more than 72 per cent of all gas trucks. Ward Electrics are standardized in other respects: Sheldon axles, Spicer universal joints, Firestone tires, General Electric motor, and Exide, Edison, Philadelphia or K-W batteries, etc.

Dealers who want to supplement their gas truck business with increased volume and profits through a line

of electric trucks will find it easy to take on Ward Electrics, because they are already so familiar with its standardized construction.

Dealers visiting the Electric Truck Show in New York the week of June 4th, are invited to visit the plant of the Ward Motor Vehicle Company at Mt. Vernon, N. Y., a short ride from the show.

NATIONAL ELECTRIC TRUCK SHOW

Steinmetz Electric Light-Delivery Truck



Standard Panel Body, Model No. 15



Standard Express Body, Model No. 10

The express body is available for both Models No. 10 and No. 15, and various styles are built to serve varied needs. For example, the express body may be equipped with screens, roll curtains, etc., if desired. Battery combinations are the same as for panel body. Mileage per charge for the Model No. 10 ranges from 42 to 62 miles.

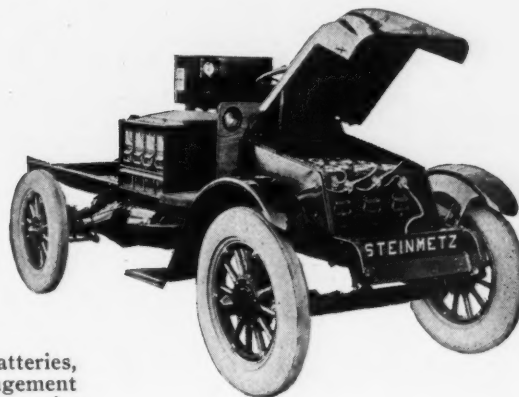
This is the popular general utility panel body $\frac{3}{4}$ to 1-ton capacity job, and special panel bodies to meet varied requirements are available. The Steinmetz Model No. 15, 1-ton truck, has a range of 45 to 70 miles per day, depending upon conditions and based on four stops per mile. An increase in both speed and range is made possible by the use of pneumatic cord tires which are standard equipment. Make of battery is optional with purchaser. Steinmetz models come equipped with any of the following:

- 42 Cells Philco Type PX
- 42 Cells Philco Type PMT
- 42 Cells Exide-Ironclad Type MV
- 60 Cells Edison

The panel body with the various battery combinations is also used on Model No. 10, the $\frac{1}{2}$ -ton chassis.

Battery Arrangement

This view of the chassis, hood up, shows the placing of the batteries, half under the hood and half under the driver's seat. This arrangement provides easy accessibility for flushing and inspection, and gives the truck the same road clearance and frame height as a gas truck, by doing away with the underslung battery. The battery arrangement, furthermore, permits the Steinmetz truck to follow the general lines of gas trucks, a departure from previous usual electric truck construction.

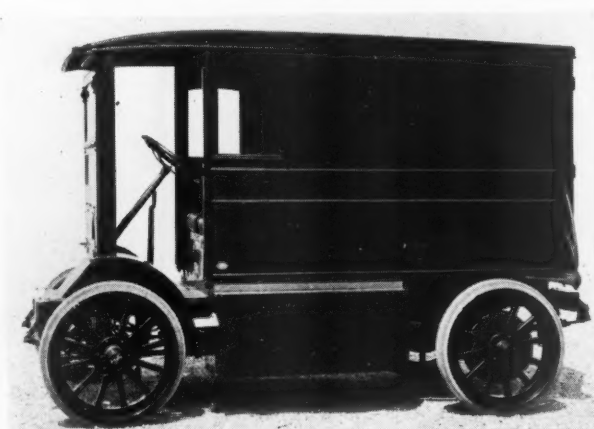


NATIONAL ELECTRIC TRUCK SHOW

Walter Electric Trucks

WALTER electric trucks are made in the heavy duty models of 7, 5, 3 and 2 ton capacities, and delivery models of $\frac{1}{2}$ and 1 ton capacities.

The delivery models are made with a special patented battery arrangement and frame construction. The batteries are divided into two sections and assembled in two narrow trays mounted on each side of the frame. Because of their position the batteries are very accessible and they can be flushed without shifting. When conditions require operation over routes of exceptional mileage, the discharged batteries can be easily and quickly pulled out and fresh charged batteries mounted in place, in this way doubling the radius of operation. With this construction there is ideal weight distribution because



The Walter One and a Half Ton Delivery Model

the center of gravity is very low and there is a greater proportion of weight on the rear drive wheels, thus insuring proper traction even for wet, ice or snow covered roads.

The weight of the batteries is taken directly by the spring hangers of the front and rear springs, in this way relieving the frame members of usual strains due to battery weight. The frame construction is therefore very simple, light but exceptionally strong.

This battery arrangement provides a very short over-all length, permitting of a short turning radius. The chassis level is very low, being 26 in. under load. This low level facilitates quick entry and exit of the driver, which is desirable in frequent delivery service. In spite of the low chassis level the clearance under the batteries is greater than with the old types of battery compartment construction.

Automatic Lock Differential

The final drive is by single reduction spiral bevel gear and pinion. The Walter automatic lock differential provides positive drive power to both wheels, resulting in "100 per cent traction" even under slippery road conditions.

The motor is of series wound, automotive type, slow speed, but of extra capacity and is located directly under the driver's seat, resulting in very short wire connections to the controller.

The controller is 5 speeds forward and 2 reverse and is mounted in a steel box under the driver's seat.

The drive is taken from the motor to the rear axle by means of a cord disk propeller shaft, which provides a silent cushion drive and eliminates the need of lubrication of the universals.

Artillery type wood wheels are used mounted on taper roller bearings equipped with special electric compound rubber tires.

The service brakes act directly on the rear wheels and are operated by the usual foot pedal. The emergency brakes also act on the rear wheels and are operated by a central hand lever.

These delivery models are quick and fast and because of their simplicity, light weight and high efficiency, they are capable of giving exceptional mileage per battery charge.

The Walter heavy duty electrics are made with the conventional type of underslug cradle in the center of the chassis, either the fixed type of cradle or the Stone removable cradle is furnished. The Stone cradle permitting the rapid interchange of batteries where longer mileages are required.

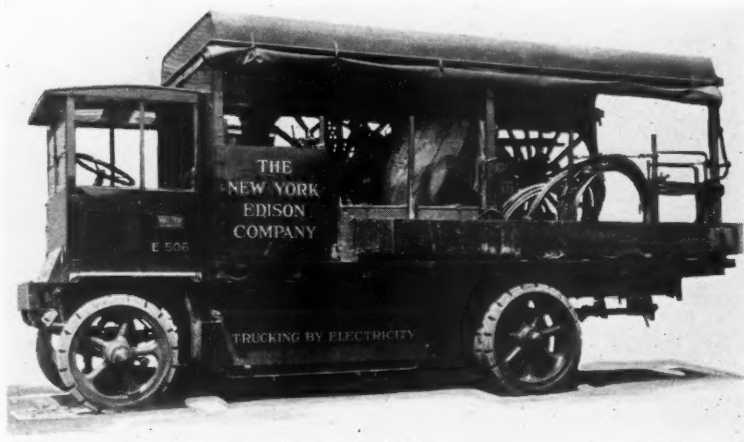
The final drive is the patented Walter suspended drive and automatic lock differential. This drive is of the double reduction type, the first reduction being by bevel gear and the second reduction by pinion and gears in the wheels. The bevel gear, differential and service brakes form a bevel drive unit which is bolted to the motor and the entire unit suspended in the frame. The drive is taken from each side of the differential through double universal shafts to the wheel drive pinions. This construction reduces the unsprung weight to a minimum, eliminates all cramping or binding of the mechanism.

The complete enclosure provides proper dirt protection and lubrication for all working parts, together with the oversize gears and bearings results in long life and very high efficiency even under the most severe operating conditions.

The automatic lock differential delivers positive power, thereby eliminating the slipping of the drive wheels and the possibility of running down the battery due to snow or slippery road conditions.

The wheels on the 5 and 7 ton models are electric steel castings, hollow spoke and rim. On the 2 and 3 ton models, artillery type wood wheels are used.

These heavy duty models are made very strong and substantial in order to provide proper capacity for the transportation of heavy loads, even under unfavorable conditions.



The Walter Five-Ton Model

NATIONAL ELECTRIC TRUCK SHOW

Profitable Trucking With Walkers

DEMAND for economy and performance, more attention to accurate cost figures, and careful buying—that is the story for those buying trucks.

The present day delivery superintendent or traffic manager must do more than make deliveries and pick-ups, he must save money. Consequently, accurate truck cost records, covering all angles of operation, are kept by successful companies. The trucking equipment that provides the best performance at the lowest total cost is more and more in demand.

Advantages of Walker Electric Trucks

These conditions are largely responsible for the rapid increase in the number of Walker Electric Trucks in use on city routes. About 85 per cent of city route trucking is logically electric truck work. No waste of power while standing still; no shifting of gears, and a quick, even pick-up make Walkers' ideal for congested city traffic and many stop routes. In addition, Walker Trucks are clean, neat in appearance, free from engine heat, noise, dirt, contaminating odors and are dependable. The simplicity of design and operation of Walker Electric Trucks insures a remarkably low number of trouble calls.

Large Savings Made by Walkers

The use of electric trucks has effected a saving of 25 to 50 per cent over other kinds of transportation on city routes. In New York, a total estimated saving of \$6,900,000 annually is being made with about 5,000 electric trucks. In Chicago, Marshall Field & Company, operating 276 Walker Electric Trucks, say: "We estimate the cost of the electric cars per day, regardless of mileage, including depreciation, insurance, license, etc., as a trifle more than one-half that of gasoline." Freedom from fire hazard is another feature of electric trucks, causing a saving by way of reduced insurance rates. In the case of property damage and

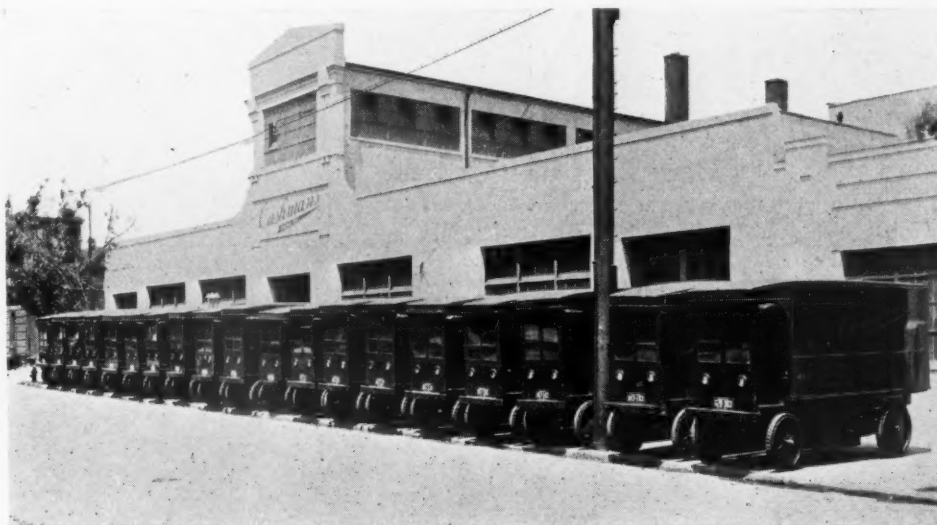
public liability a reduction of 25 per cent is granted; and in the case of theft and fire, the reduction is even greater.

Extensive Adoption of Walker Electric Trucks

Perhaps the best way to indicate the recognition of the superior economy and performance of Walker Electric Trucks on city routes is to call attention to the rapidly increasing number of electric truck sales. In New York, for example, during the first four months of 1922 the sales of electric trucks showed an increase of 239 per cent over sales for the previous year.

Six Walker Models

There are six Walker Models, ranging from ½ ton to 5 tons in capacity. They are as follows:



A Few of the 149 Walkers Used by Cushman Sons, Inc., New York Bakers, One of the Many Large Local Walker Fleets

Model 12, 1,000 lb. cap.	Model P., 7,000 lb. cap.
Model 22, 2,000 lb. cap.	Model N., 10,000 lb. cap.
Model 42, 4,000 lb. cap.	Model M3, Parcel Del.

All models except Model 12 are equipped with the famed Walker Balance Drive, which is at least 97 per cent efficient at all speeds and loads.

Walker Dealerships

About two years ago a district manager of a leading gas truck company observed that his customers were investigating and installing Walker Electric Trucks. He also investigated, came to Chicago, went through the Walker factories, and discovered that even during a general business depression they were operating to capacity. He reviewed the cost figures on scores of trucking situations. He then asked for a Walker dealership, and because his qualifications were very high, secured it. Since that time he has established three branch offices. He has more than quadrupled his net profit. A wise rule for all those who make a business of selling is to get in line with the demand. Successful truck dealers realize that they must sell their prospects on actual economy and performance.

NATIONAL ELECTRIC TRUCK SHOW

The O. B. Electric Vehicle

THE O. B. Electric Vehicle, manufactured by O. B. Electric Vehicles, Inc., Long Island City, N. Y., is a member of that family which stands for economy, safety, and service in transportation within a radius of 50 miles.

Two predominating features of the O. B. Electric are ease of power, application, and transmission resiliency. As one of the factors of greatest loss in operating machinery of any kind is incurred by the shock of starting and stopping, life is considerably increased by eliminating this factor. In the design and construction of the O. B. Electric Vehicle, reduction of each shock was one of the prime considerations held in mind.

This vehicle is ruggedly constructed, well proportioned, stable, and contains no complex drives. All parts are readily accessible for inspection or repair and since they are used in duplicate throughout, need for a large stock of parts has been avoided. This reduction of stock has been brought about by the elimination of 98 per cent of the right and left parts which have been substituted by a part that can be used on either the right or left side. For this reason only a small supply of replacement parts are necessary to properly service O. B. Electric Vehicles.

Exceptional braking action provides full control of the vehicle in any emergency. Fast reduction of vehicle speed to final stop is accomplished by a service brake, foot operated, possessing the position locking feature, and a hand operated emergency brake, having the same feature. These two brakes when applied together, stop the vehicle in the shortest time possible without shock to the power plant.

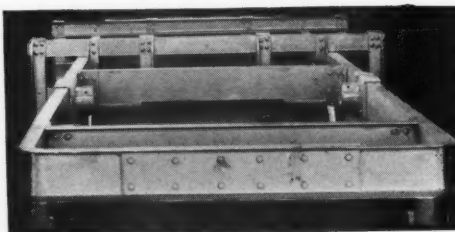
The controller, which is fully covered by patents, will start the truck gradually and bring it to full speed without recouring to intermediate stops, such as experienced in turning on steam to an engine. It provides 1001 speeds ahead and a similar number in reverse. With it the charging current to the battery can be regulated to 1001 points. It also controls any other D. C. electrical device, such as lights, etc., a similar number of points.

The charging current is controlled on the vehicle. The charging equipment includes a Sangamo ampere hour meter, circuit breaker, charging switch and current controller. Expensive charging panels are not necessary. To charge it is only necessary to attach the battery

and the vehicle to the charging cable through the receptacle, then set the switch and circuit breaker and the battery will be automatically charged and disconnected, ready for work.

The motor is a standard General Electric type. Power is transmitted from the motor to the differential shaft through a silent chain run in oil. Final drive is also chain. The steering apparatus is of the gear, sector type, readily adjusted for repairs.

The following list includes some of the units, materials and systems employed in the construction of this vehicle: General Electric automobile motor, Timken bearings, Archibald wheels, spring perch springs, Sangamo locomotive type meter and automatic cut-out, Allen-Bradley contactors and resistors, Morse motor chain running in oil, Warner gear differential, "O. B." controller, "O. B." power and lighting system, "O. B." braking system, "O. B." chassis construction and "O. B." name plate and high pressure oiling system (not grease).



Showing Sturdy Chassis Construction

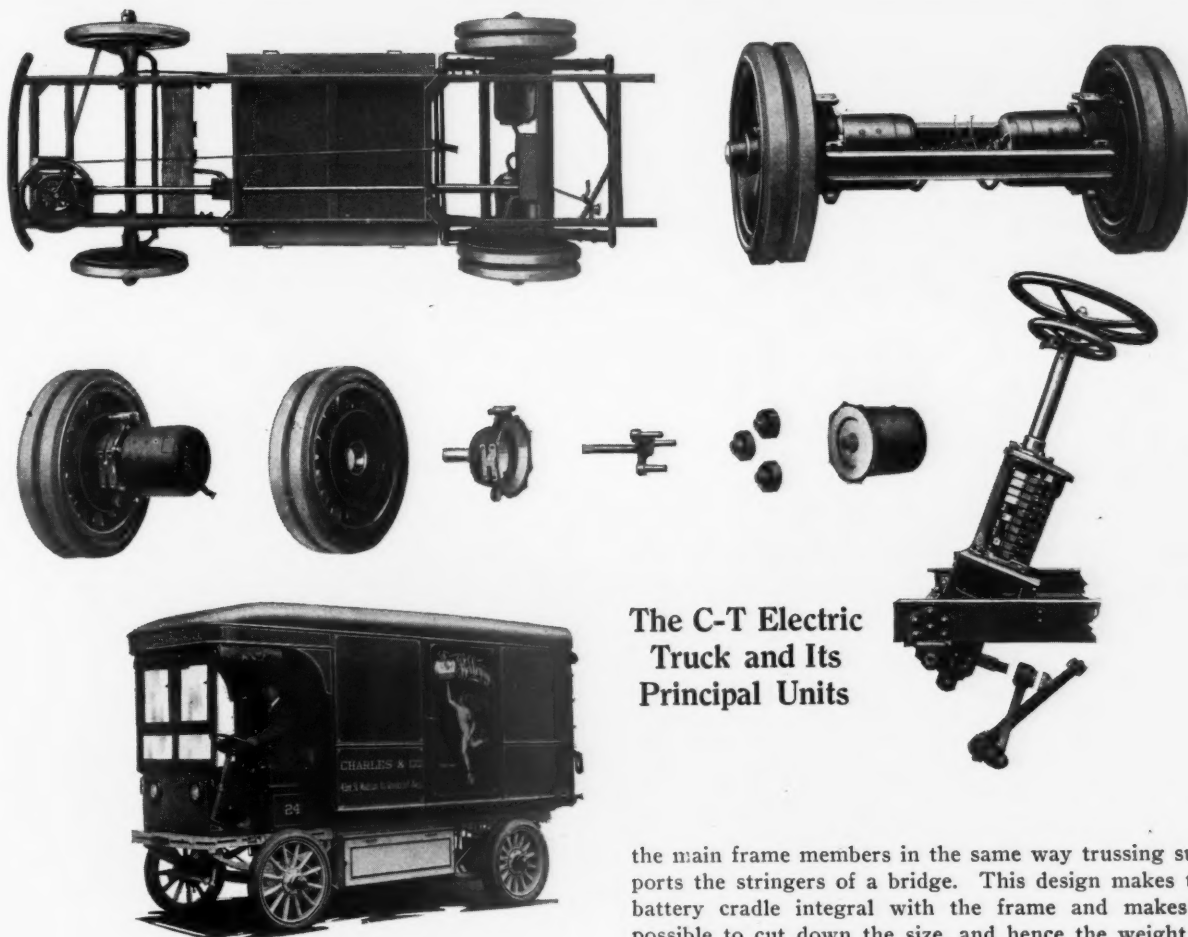


Two-Ton O. B. Model



Two Body Types on Three and a Half Ton O. B. Electric Chassis. Note the "Bowling Alley" Platform of the Open Model. This Avoids Acid Leaks in Breakage From Penetrating Floor Boards

NATIONAL ELECTRIC TRUCK SHOW



The C-T Electric Truck and Its Principal Units

C-T Electric Trucks

THE three main features of the C-T Electric Truck, its power plant, its frame and its control stand out as distinctive. The main features of this design were adopted sixteen years ago, when the first C-T was built. In all those years it has been retained intact, except for a number of refinements, and has proven its worth in the service of many hundreds of users.

Two-Motor Drive

Instead of using a single motor and dividing the power between the driving wheels, the C-T makes use of a separate motor geared and in fixed relation to each driving wheel. This principle eliminates the necessity for propeller shafts, universal joints and differential gears, making an extremely simple rear assembly and providing maximum traction. The illustration shows the C-T driving axle complete, the component parts of the driving unit and how it is assembled.

Bridge Construction of C-T Frame

The familiar bridge type of construction has been utilized in the C-T frame. Truss rods running from the frame to the corners of the battery cradle support

the main frame members in the same way trussing supports the stringers of a bridge. This design makes the battery cradle integral with the frame and makes it possible to cut down the size, and hence the weight of the frame members, providing an unusually light but rugged construction.

The C-T Controller

The C-T Controller is placed around and forms the base of the steering column, where it is easily accessible for adjustments or repair and where it is out of the driver's way and does not interfere with loading space. It is operated by a small wheel directly under the steering wheel at a point most convenient for the driver. The controller is designed in such a way that the switch fingers will not readily create arcs and burn out.

C-T Plant

The plant of the Commercial Truck Company is located in Philadelphia and a chain of service stations are operated in the leading cities of the country, where a complete stock of parts is maintained and prompt, reliable service given at all times.

The company offers its users a unique maintenance contract by which it agrees to furnish complete or partial maintenance on a truck for any period from one to fifteen years at a fixed sum per month. Requests for further information on C-T Electric Trucks, C-T service on the C-T maintenance contract should be addressed to Commercial Truck Company, Philadelphia.

NATIONAL ELECTRIC TRUCK SHOW

Milburn Electric Trucks

SIMPLICITY of design and interchangeability of parts, within practical limits, have been aimed at and carried out to a marked degree in the Milburn trucks, models 43, $\frac{1}{2}$ -ton capacity and 40, 1-ton capacity. In this way the all important matter of maintaining continuous and economical service has been amply safeguarded.

Unit Power Plant

For instance, the power plants in both trucks, including motor, controller, resistance and motor brake, which are assembled together as one unit, are interchangeable and can be easily and quickly removed from one truck and placed in the other, by simply removing a few bolts.

This is a great advantage to all users and particularly to fleet operators; it reduces spare parts stock and carrying charges.



Milburn Model 40, One-Ton Truck in the Service of the Toledo Edison Company

Standard batteries on both trucks are of the exchange type, mounted on tracks in such manner that they can be easily rolled from their compartments when an exchange is necessary and so trayed that the front unit, mounted under the hood and the second unit, mounted under the seat, can be either interchanged with each other, or may be removed, for instance, from the half-ton truck and mounted in the one-ton truck or vice-versa. Thus it will be seen that if the user cares to stock an extra battery it may be used on either truck.

Interchangeability of parts has been developed to a point never heretofore attained. It is impossible to emphasize with sufficient force the all important value of this feature both to dealers and users.

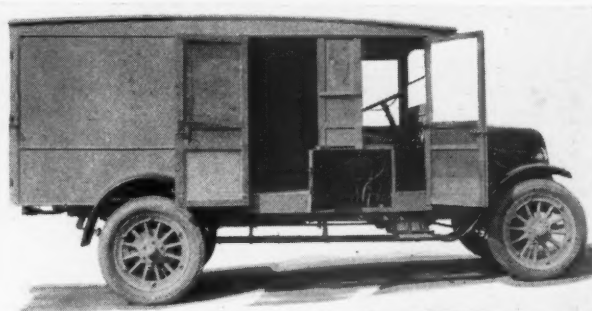
In the selection of accessory parts, not manufactured in the Milburn plant, only those of recognized merit and standardization have been chosen, first to assure dependability in performance and next to provide for prompt service. Although the company does not expect to supply bodies built to special order it is its intention to

carry a stock of bodies of standardized dimensions, including panel bodies, bodies with screen sides and roll curtains, either with or without flare boards; open side bodies with canopy and roll curtains, either with or without flare boards and stake and rack bodies.

Milburn electric trucks are offered with complete equipment so that when ordered with bodies they will be ready for service immediately on reaching their destination; when ordered without bodies the equipment will include everything necessary for intelligent operation except the body. This policy will save both the dealer and the user unnecessary confusion, loss of time and increased expense, against the procedure of supplying the bare chassis and imposing on the dealer or user the responsibility of buying and installing fenders, running-boards, instruments, etc., etc.

The Hi-Lo Control Switch conveniently mounted on the instrument board, provides extra safety when operating in congested traffic and conserves current consumption over routes where stops are frequent. The controller is provided in two positions, for fast or slow work. Except in the case of Edison batteries, all standard batteries are trayed exactly alike and are mounted on rollers, which roll on tracks under the hood and seat. This insures unlimited mileage when an extra battery is carried in stock and provides the further advantage that the extra battery, on account of the traying, may be used in either truck. Milburn Electric Trucks include as standard equipment an instrument board, mounted under the cowl in plain view of the driver, containing the following: Ammeter, speedometer, sangamo meter, Hi-Lo control switch, and lamp switch button for headlights, dimmers and tail light.

Standard equipment includes: Pneumatic cord tires, front lamp, non glare; tail light, fenders and running-boards, front bumper, Alemite lubrication, extra tire carrier, extra rim, tool box and charging receptacle. The Milburn Wagon Company is located in Toledo, Ohio.



This is a View of One of a Fleet of One-Ton Milburns, Recently Sold to a Baking Company

NATIONAL ELECTRIC TRUCK SHOW

Kelland Electric Chassis of Modern Design

IN the design and construction of the Kelland electric every effort has been directed toward simplicity, durability, reduction of unsprung weight and increase in efficiency. Moreover, no radical or unusual features of construction have been incorporated in this model in the endeavor to secure these features. Only well established and standardized principles, readily understood by the average garage mechanic have been employed. All illustration in point is the extreme simplicity of the wiring system.

Other features of construction worthy of note are: Reduction of weight without sacrifice of strength; elimination of heavy steel underslung battery compartment with provision for placement of battery in body partly under driver's seat, where it is not only more accessible but permits of greater road clearance; double reduction straight line drive, which has reduced to a minimum the transmission of power through universal joints, thus decreasing current consumption and increasing daily mileage; rear spring construction which is such as to take the drive through the springs. These springs are also reinforced by a sturdy spring bar, eliminating troublesome radius rods. These and other

points on the new Kelland all tend toward better service.

The following is a brief description of the chassis: Steering is through a Ross irreversible, solid nut and screw type steering gear. The frame is reinforced by six cross members and gusset plates. Driving torque is taken through the springs. Power is transmitted from an enclosed General Electric motor equipped with a General Electric controller of the continuous torque type and rheostat of the cast grid street car type to a bell type transmission, having helical spur gears in constant mesh, and mounted in unit with the motor. This power unit is rigidly mounted on the frame with a specially designed hanger. The transmission is wholly supported by the frame. Final drive is through a single reduction, full floating type, helical, bevel-gear rear-axle. The controller is operated by a conventional hand lever at the right of the driver which is directly connected to the controller under the floor-boards, thus assuring positive control and accessibility. It is equipped with a positive stop and spring catch to insure stopping in neutral before entering reverse positions. The safety or main switch is of the three way type with positions for running, charging and off.

Among the Features of the Accessible Battery Compartment

It places battery where it may be inspected, watered and cared for without moving it around, thus saving considerable labor.

It places battery on top of frame, above the springs, where it is free from all road shocks.

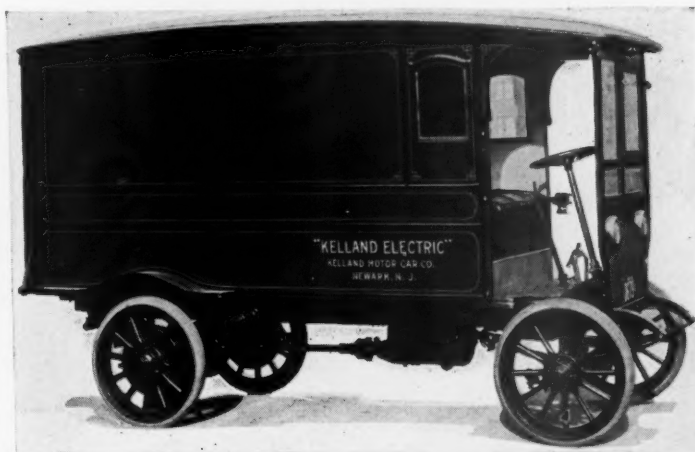
It decreases weight of car from 300 to 400 lb. thus increasing mileage per charge, and tire mileage.

It decreases wind resistance of car.

It permits the use of smaller size wheels and lowers frame 6 inches, which is a big factor to driver, who is constantly getting in and out of car.

It permits driver to load and unload merchandise from rear of car at a considerable saving in time, due to height from floor of body to ground.

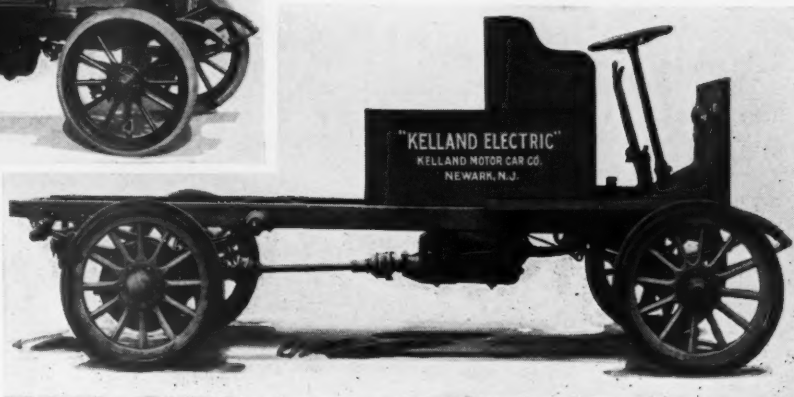
It is designed so that complete battery can be watered from rear of compartment, in body.



Specifications of the Model B With Panel Body

Carrying capacity% to 1 ton
 Mileage per battery charge45 to 60
 Speeds in miles per hour13 to 15
 Controller speeds...4 forward, 2 reverse
 BatteryOptional (Edison or Lead)
 Wheelbase102"
 Track56"

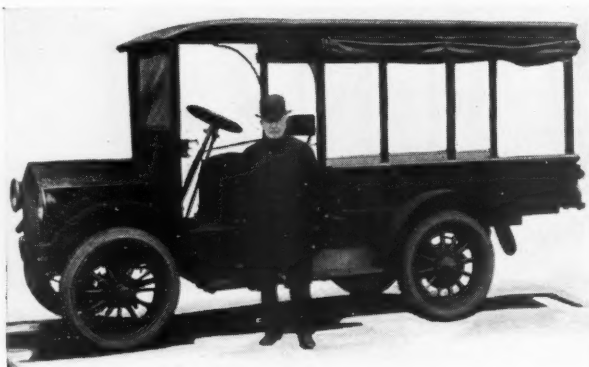
Loading space8' 6"
 Inside width of body44½"
 Inside height of body5' 3"
 Height to floor (unloaded)34"
 Overall length with body13' 4"
 Overall width (hub caps)65"
 Front tires34" x 3½" solid
 Rear Tires34" x 3½" solid



NATIONAL ELECTRIC TRUCK SHOW

Lansden Electric Trucks

LANSDEN electric trucks, built by the Lansden Company, Inc., Danbury, Conn., are pioneers in the industry. The first Lansden electric truck was built in 1904 for the Adams Express Company, and after eighteen years of daily money-making was finally retired in 1922 by the American Railway Express. That first Lansden electric gained wide fame as "Adam," the ancestor of the 1500 electrics now operated by American Railway Express.



The product of the Lansden Company embraces a range of capacities from 1250 lb. to 5 ton and two types; the Century model, a double reduction drive, and the Marathon model, a heavy-duty chain drive.

A Lansden Electric Century model holds the world's record for mileage on a single battery charge—112.4 miles. This Lansden Century model is the outgrowth of years of experiments looking toward better electric vehicle performance and Lansden has now achieved this by the reduction in weight through the use of high quality alloys and more important still, the inherent efficiency of the integral unit double reduction mechanism.

The drive unit is unique in its efficiency, its absence of universal joints, its oil bath for all gearing, its positive and permanent alignment of gears. The housing is a steel casting. All parts subject to renewal or repair are simple and accessible.

The following features are directly attributable to the integral unit double reduction drive, floating rear axle, accessibility, a motor mounted on the frame and cushioned from road shocks by both springs and tires, elimination of universal joints in the line of drive, positive and permanent gear alignment, easy change of gear ratio and silence in operation.

The Lansden Marathon model is designed for heavy-duty work and in general embodies the Lansden traditions of design. Drive is bevel-gear from motor to jackshaft and by roller chain from jackshaft to rear wheels. This drive affords maximum heavy-duty efficiency and minimum upkeep costs because of its simplicity and accessibility.

All types of batteries are adapted to Lansden electrics. Exclusive Lansden features are as follows:

SAFETY CONTROLLER HANDLE

Eliminates possibility of passing controller from forward speeds into reverse accidentally.

INTEGRAL UNIT DOUBLE REDUCTION DRIVE (Century Model)

Maintains all gearing in positive and permanent alignment. Eliminates universal joints, and their power losses, in line of drive.
Insures maximum efficiency in transmitting battery energy into vehicle miles.
Provides complete and instant accessibility.

3-POINT SUSPENSION UNIT MOTOR AND JACKSHAFT ASSEMBLY (Marathon Model)

Insures permanent alignment of power unit and resulting maximum efficiency.

SELF-ALIGNING RADIUS RODS (Marathon Model)

Prevent distortion of driving mechanism.
Increase life of chains, sprockets, tires, etc.

ROLLER BATTERY CRADLE AND DROP DOOR (All models on which battery is underslung.)

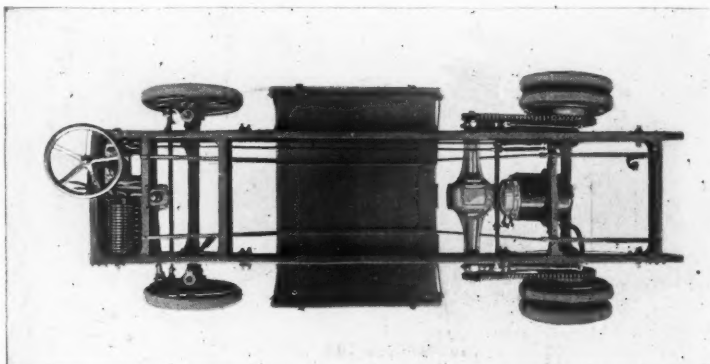
Battery is carried on roller bearings in cradle and when battery cradle door is dropped it serves as a shelf for battery to roll out on. 5-ton battery easily handled by one man. This facilitates battery inspection and results in increased battery life.

SPRING-GOVERNED EMERGENCY BRAKE (Marathon Model)

Powerful because applied to motor shaft. [Braking effort multiplied by gear reduction between motor and wheels.]
Smooth because spring-governed.
Positively eliminates twisting strains on drive mechanism.

LANSDEN ELECTRICS have also been developed along two specialized applications:

- (1) Trackless trolley buses; in effect, trolley cars rolling on rubber tires instead of steel wheels and tracks.
- (2) Storage battery buses; in effect Electric chassis fitted with bus bodies with special spring suspension for easy riding.



View Showing General Lay-out of the Lansden Electric Truck.
Note Compact Unit Assembly of Transmission and Rear Drive

NATIONAL ELECTRIC TRUCK SHOW

The Exide-Ironclad Battery

ALTHOUGH the Electric Storage Battery Company of Philadelphia has produced a number of types of vehicle batteries, the one most strongly recommended by them for heavy-duty service is the Exide-Ironclad battery described herewith.

This battery, possessing high power ability and efficiency with great durability and long life, embodies the four requisites that are absolutely essential in a storage battery for vehicular work.

It is a battery that will deliver an increase in power output up to twenty times its normal rate of discharge, assuring ample reserve power for heavy loads and steep grades.

It maintains a good voltage throughout its entire discharge, assuring a good truck speed all day long. It can be charged economically and efficiently at high rates for short periods.

It may be stated, in describing this battery, that it is altogether different in construction and performance from any other battery in existence; this difference being due largely to the novel construction of its positive plate and to the method of assembling in the cells.

One of these positive plates is shown in an accompanying illustration. The surface of this plate consists of a series of vertical ridges or ribs. These ribs are hollow tubes of finely slotted rubber, within which the active material is contained. The slots in the tubes are so fine that, while they permit ready access of the electrolyte to the active material within, they prevent the latter from washing out and dropping to the bottom of the jar.

The two feet on the bottom of the plate support it on two ribs which extend the whole length of the jar and which support all the positive plates. (Two other ribs in the bottom of the jar support the negative plates.)

The negative plate is not unlike the negative plate of the regular Exide vehicle battery except that it is thickened to meet the increased life and power of the positive.

The manner of assembling the positive and negative plates with the specially treated wood separators between them

is illustrated in the cutaway view of the cell. A close inspection of this illustration will show how the negative plates are all supported on one set of ribs and the positive plates on a different set. It will also show that the feet on the bottom of the plates raise them above the ribs and permit the separators to come below them.

With this assembly, it is obvious that any sediment that accumulates on the supporting ribs will not do

any harm, for even if it should bridge over from one plate to the next, all the plates supported by that particular rib would be of the one kind. However, "bridging" is not likely to take place because the separators come well below the bottoms of the plates efficiently insulating them, and because ample sediment space is provided by the height of the ribs.

This very thorough protection against internal short circuiting is one of the reasons for the long life of the Exide-Ironclad battery. But the sturdy, rubber compound jars—practically unbreakable in normal service—and the efficient manner of sealing the elements in the jar, are among the contributing factors.

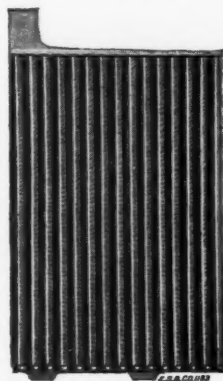
Aside from long life, this battery's tremendous reserve power, sustained energy and low maintenance cost are worthy of note.

All day long—even till late in the afternoon—the Exide-Ironclad battery will impart a good speed to the vehicle in which it is installed, its reserve power being apparent in the ease with which it continues to pull its full load or negotiate steep inclines.

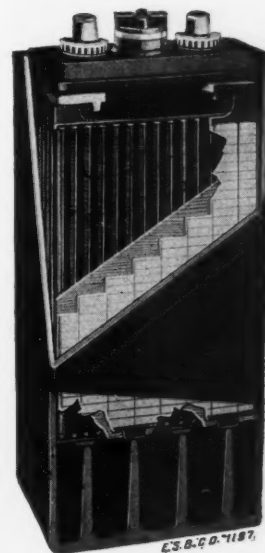
It is not until the battery has been in use for some time, and its upkeep cost carefully computed, that one realizes how economical the Exide-Ironclad really is. For if the upkeep cost is then divided by the number of tons of material hauled, it will be found that its ton-cost is exceptionally low.



42 Cell Exide-Ironclad Battery for Electric Truck



Type MV Positive Plate



Note the negative plate resting on the two ribs in the foreground. Immediately behind is seen a separator, and behind this a positive plate resting on the other two ribs.

NATIONAL ELECTRIC TRUCK SHOW

Edison Nickel-Iron-Alkaline Storage Battery

WHEN Thomas A. Edison produced the electric storage battery which bears his name, he added to his already long list of great inventions one which, while it appealed less to the imagination of the general public, was no less daring in the novelty of its conception and its departure from hitherto accepted standards of the possible, than the better known incandescent light or phonograph.

The development of the battery, the production of which has since become a great industry was incidental. Mr. Edison needed a battery for use in a series of experiments on which he was engaged. No battery of the lead acid type, which was the only one commercially known at that time, was found able to meet the exacting requirements of the case and Mr. Edison undertook to produce a battery for his own use.

The result of his study which included the performance of more than 50,000 experiments, chemical, electrical and mechanical, was a storage battery different in every essential feature from all which had preceded it.

It was built of nickel-plated steel, its mechanical parts designed with all regard for strength and lightness, and the electrolyte was an alkaline solution with active materials of nickel, hydrate and iron oxide held in sealed metal containers.

While it is less than twenty years since the Edison battery was first placed upon the market, its influence in the development of electric transportation on the street or in the factory has been probably as great as that of any one factor. Its light weight, the great length of life which its design and method of manufacture make possible, and its resulting low yearly cost, its mechanical and electrical reliability, have given users of transportation a confidence in and enthusiasm for electric vehicles which could hardly have been built up without it.

Conditions made the development of the gasoline truck and of gasoline driven haulage so much more rapid than that of the electric that the latter seems almost to have stood still by comparison. This is not the case. The last few years have seen a steadily increasing appreciation on the part of users of large scale transportation of the advantages of electric propulsion in urban work and the yearly production of trucks and batteries has increased in obedience to it. Those in the industry believe that the next few years will show an increase in the use of electric trucks, proportionately greater than those which have just passed, and to this development, Thomas A. Edison, with his far-sighted innovation of an all-steel acidless storage battery has been one of the greatest contributors.

The following is a general description of the Edison nickel-

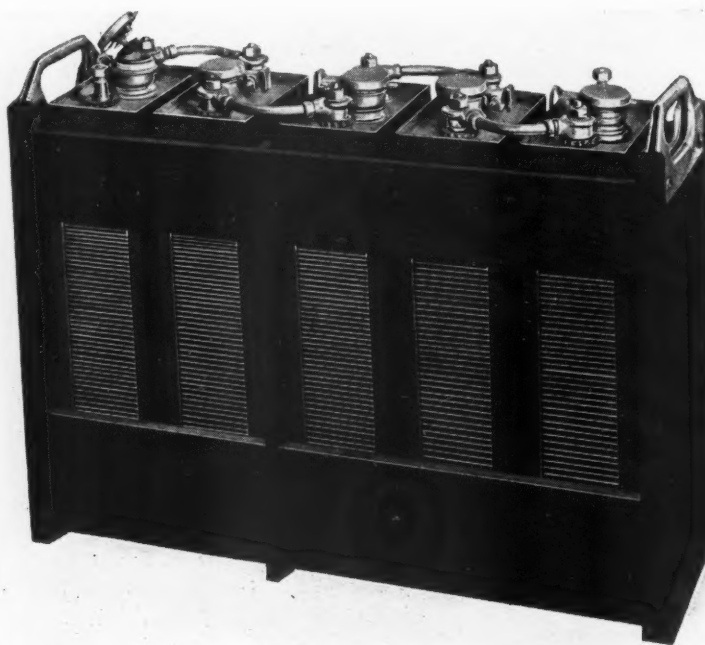
iron alkaline storage battery. The assembly of this battery follows general practice, consisting of positive and negative elements, separators, connectors, containers, etc. The positive plate is made of active material known as nickel hydrate, packed in thin layers under heavy pressure in perforated steel tubes. Between the layers of nickel hydrate are still thinner layers of pure nickel. During charge and discharge of the battery the passage of the electric current alternately oxidizes and reduces the nickel hydrate. The metallic nickel acts as a conductor, forming a path of low resistance to all parts of the active layers of hydrate. These steel tubes after being loaded with the active material are strengthened by a number of encircling seamless steel rings. Then they are mounted in a steel grid or frame.

The negative plate consists of a steel grid, which supports a number of flat, perforated, steel containers or pockets. The active material of the negative plate is iron oxide which is held within the pockets. Passage of current during operation of the battery causes the active material of the negative plate to be alternately reduced and oxidizes according as the battery is charging or discharging.

The positive and negative plates are mounted on steel rods which are integral with the tapered steel holes projecting through the top of the cell for external connection. They are known as positive and negative elements. These elements or groups are then intermeshed, separated electrically by rubber insulators.

This assembly is then ready to be inserted into a container completing one unit of the battery. The cell container is nickel-plated in and outside. This cell is hermetically sealed except for a small opening in the cover to permit passage of the gases given off during charge and for the addition of electrolyte and water. The opening in the cover is provided with a spring filler cap containing a gas valve. The holes through which the poles pass are sealed by suitable soft rubber gaskets. The electrolyte is an alkaline solution which does not vary appreciably in specific gravity during the cycle of charge and discharge.

Finished cells are mounted in wooden trays connected to one another by proper connectors. Each cell is supported by rubber buttons embedded in the tray slats. The cells are provided with steel bosses which fit into the rubber buttons in the tray slats. The trays are made to contain any desired number of cells to accommodate different conditions.



Edison Five Type A5 Cells in a Standard Bottomless Tray Connected Up, Ready to be Coupled to Other Trays.

NATIONAL ELECTRIC TRUCK SHOW

The New Philco Type P. M. T. Battery With the New "Philco Process Plates"

RESearch engineers of the Philadelphia Storage Battery had been experimenting for nearly a decade with plates containing a new material which, in tests, showed almost uncanny results in power, capacity and life.

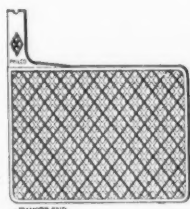
The practical difficulties in the way of manufacturing the new plates in commercial quantities seemed for a long time insurmountable. Finally, however, the "Philco Process" was evolved and perfected which makes quantity production of these plates now possible.

"Philco Process Plates"

"Philco Process Plates" are plates of extraordinary hardness and porosity. Philco batteries equipped with these new plates—when used in electric motor trucks, mine locomotives and other heavy-duty service—have shown phenomenal results in greater power, greater capacity, longer life and lower cost per month of service.

Although the remarkable results obtained from the new Philco Type P M T Battery are due largely to the new plates, other exclusive features—such as the diamond grid, Philco slotted retainers and quarter-sawn hardwood separators—are also of great importance.

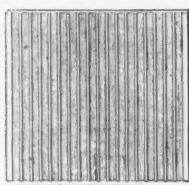
The Diamond Grid



All "Philco Process Plates" have the famous patented diamond grid, a form of construction used universally for bridges, trestles, derricks, cranes and other structures where maximum strength is demanded.

Buttressed in every direction against shock and strain, the diamond grid can't buckle, can't warp, can't short-circuit. The double latticing of the diamond grid bars locks the active material tightly on the plate and prevents plate disintegration.

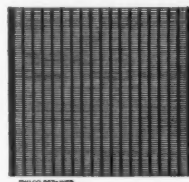
Quarter-Sawn Hardwood Separators



These separators are made only from giant trees 1000 years or more old. They are quarter-sawn to produce alternate grains of hard and soft wood. Each soft, porous grain act as a direct part for the circulation of acid and current from plate to plate, while each hard grain holds the plates apart to provide perfect insulation.

With the quarter-sawn separators, no portions of the plates are either overworked or underworked. Perfect insulation of plates plus perfect conductivity of acid and current make the perfect separator.

Philco Slotted Rubber Retainers



The Philco retainer is a thin sheet of hard rubber, perforated with a large number of very narrow slots, placed on both sides of each positive plate. Its function is to prevent the active, power-producing material from falling off the plates.

For years, the Philadelphia Storage Battery Company, in common with other battery manufacturers, experimented with various devices for holding the active power-producing material on the plates and thus help to prolong battery life. The device most commonly used was a sheet of rubber perforated with round holes.

The objection to this form of retainer was that when the holes were made small enough to prevent passage of the active material, they obstructed passage of current and acid, thus reducing battery efficiency.

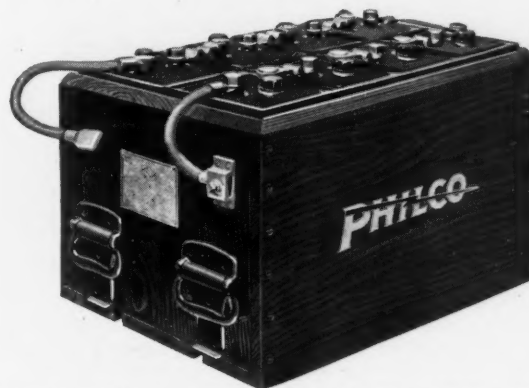
Then the Philadelphia Storage Battery engineers discovered the slot—the ideal shape for holding solids back and letting liquids through. The Philco slotted rubber retainer actually adds 41 per cent longer life to a battery.

Burned, Bolted Inter-Cell Connectors

Another exclusive feature of the Philco battery for electric motor truck service is the method of connecting cells. The connector consists of a heavily lead-coated flexible copper strip, with a stud hole at one end and a lead head cast integral with it at the other end.

In the assembly the lead head end is burned to the solid lead post on the positive terminal of one cell and bolted to the negative post of the adjoining cell by means of a nut threading over a lead-coated brass stud cast integral with the negative strap.

This construction has the advantage of a bolted connection in that all cells are readily demountable and at the same time retains the non-corrodible feature of a burned connection, since the electrolytic action as the negative is to protect rather than corrode the brass studs.



Note the Rugged Assembly of the New Philco Type P M T Battery for Electric Trucks. Easy to Fill; Easy to Clean

NATIONAL ELECTRIC TRUCK SHOW

What the Electric Truck Means to the Central Station

By ARTHUR WILLIAMS, General Commercial Manager the New York Edison Company



THE electric motor truck and its future is of interest to every Central Station in the country. Its operation increases the sale of electrical energy and so directly increases the annual revenue of the Central Stations and it decreases the transportation costs when properly applied within its field of usefulness.

Amplifying the first reason for the interest in electric motor trucks, I want to tell you how the storage battery truck, by its consumption of current, is a valuable source of income to the Central Stations and especially to those operating in large cities. In the New York Metropolitan District, over 30,000,000 kilowatt hours of electricity are sold annually for the charging of electric trucks. The Central Stations in the territory have thus derived an annual revenue of approximately \$1,000,000, and the entire industry has benefited. Chicago sells nearly \$800,000 worth of current each year for electric truck charging and cities like Boston, San Francisco, New Orleans, Philadelphia, and Hartford have also realized the wisdom of promoting the sale of electric motor trucks. In one year eight garages in New York City consumed approximately 5,000,000 kilowatt hours of electricity for charging purposes.

Most Central Stations consider the ordinary household electric iron a good source of revenue and annually spend thousands of dollars for promoting its sale. One electric truck will consume 6,000 per cent more electricity than such an appliance. Of course it is true that the volume of sales is not as great in the case of trucks, but it has been demonstrated that similar activity in furthering the cause of the electric motor truck is equally productive of results.

The revenue which comes from the sale of charging current is in direct ratio to the amount of effect put forth in advancing the electric truck. The Central Stations can do this most effectively because the general public looks to the Central Station for advice in matters electrical and will accept its word regarding the electric motor truck as readily as in anything else. Newspaper advertising, pamphlets, follow-up letters and all the aids known to advertising should be used. But most important, the Central Stations should use electric trucks for its own transportation needs wherever the mileage requirements warrant.

The second point that I wish to emphasize is that the electric truck reduced the transportation costs of the Central Station trucking fleets to a degree not always appreciated by the executives of these companies. The New York Edison Company is now using more than 132 electric motor trucks and the Consolidated Gas Company of New York operates a fleet of approximately eighty electric trucks.

Regarding the economy of using electric motor trucks on congested city streets let us consider what the largest user of electric trucks in the world has to say about their problems. The American Railway Express Company now operates over 1,500 electric trucks, including both street and industrial trucks, and is rapidly increasing its fleet. Robert E. M. Cowie, vice-president of the company, has stated that the electric truck in the service of the American Railway Express Company is indispensable, and further, that 85 per cent of all the trucks purchased for use in the New York City District during the past few months have been electric. These statements are sufficient to prove the economy of the electric motor truck even without taking into account its other numerous advantages.

The tires on an electric truck give exceptional service and will cost less than the costs of shoeing horses doing an equal amount of work. The absence of stress and strain lessens the cost of repairs and gives the electric truck its life of ten years and over.

At a recent meeting of insurance authorities it was decided to grant a further preferential rate of 15 per cent in favor of electric trucks.

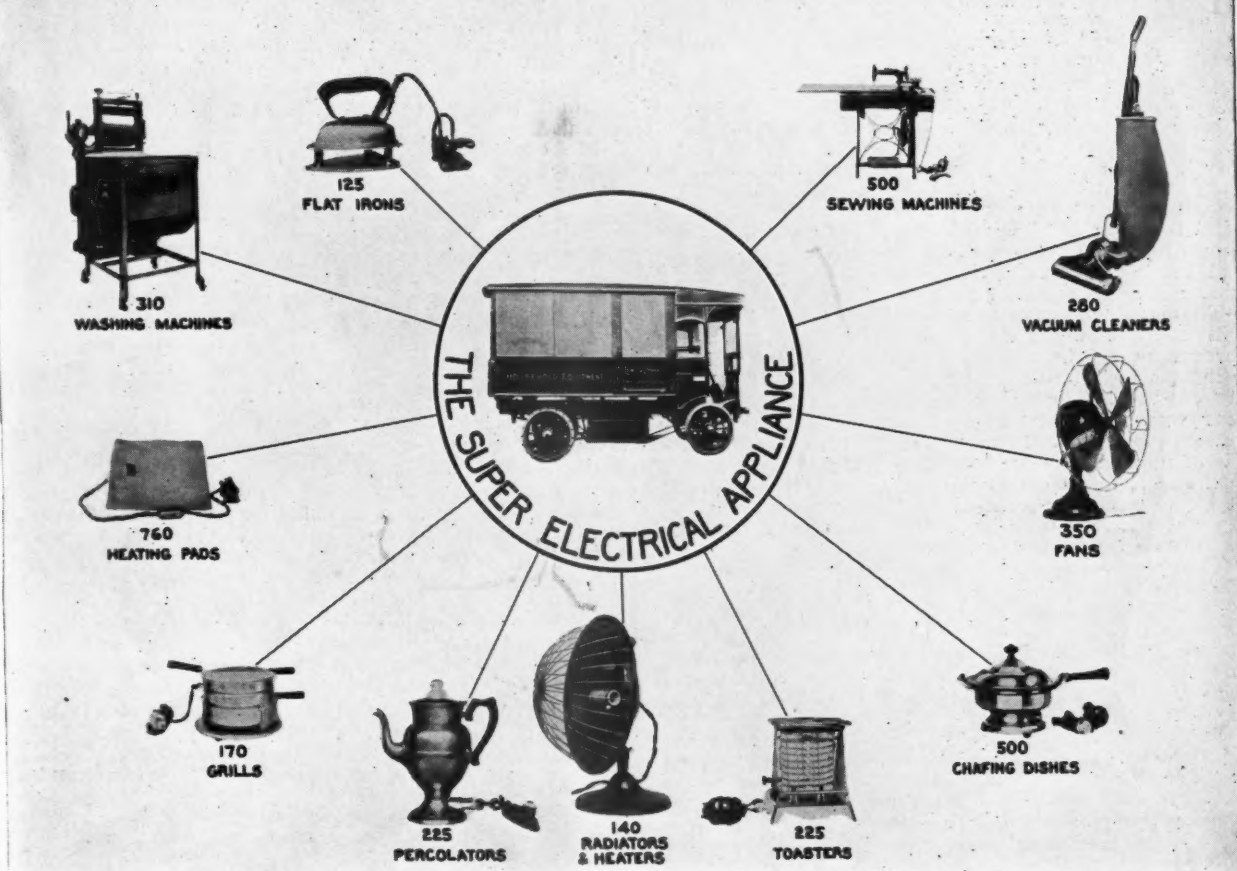
Another point I wish to advance is the fact that the economies of the electric truck are not alone of advantage to the trucking industry, but its value is of benefit to the community. In our New York Metropolitan District 125,000,000 tons of freight are annually delivered at the various transportation terminals. While

A Four-Ton Crane Mounted on a Five-Ton Electric Truck is Used by The New York Edison Company for Handling Material in Its Different Storage Yards. This is the First Material Handling Unit of This Type Ever Built.



NATIONAL ELECTRIC TRUCK SHOW

COMPARATIVE YEARLY ELECTRICAL CONSUMPTIONS



the railroads and barges may have brought the freight to the city cheaply, yet motor trucks must take care of its delivery to the ultimate consumers. Food stuffs are often handled as many as eight times before reaching their destination. It is here that the advantages of electric trucks are seen at their best. Their economy is reflected in reduced cost to the consumer.

The desirability of the electric truck in transporting freight within the city limits, insofar as it affects the public welfare, is furthered by its safety because of its control and freedom from fire hazards. The duPont Company is now operating three electric trucks for the movement of explosives. This is another demonstration of the safety of the electric truck.

A firm, in the New York Metropolitan District, after experimenting with all types of transportation, placed an order for 177 electric trucks. The reason given for choosing the electric was that they were found to be more economical to operate, more sanitary, and that they remain in service more days during the year than any other type.

Consideration of the arguments in favor of the electric truck will convince one that the sale of the storage battery truck should be promoted by the Central Stations. Chicago now has about 1,500 electric trucks within its borders and their rapid increase in that territory is largely due to the active support of the Central Station Company. In Boston there are some 800 electric trucks using nearly 6,000,000 kilowatt hours of electricity yearly.

An editorial entitled "Why the Vehicle Waits," which appeared in the Electrical World and which was reproduced and mailed to 1,200 individuals and firms brought into my office a large number of replies. I want to tell you of just one answer that was typical. The writer had investigated the situation in his own city and discovered that there was but one electric truck garage in the place. In spite of the fact that this one garage used approximately 200,000 kilowatt hours annually, and that the electric vehicle charging load comes at an off-peak period, the business was not sought by the Central Stations Company. From what I know of the conditions in the city mentioned, the sale of electricity for charging purposes there should exceed 500,000 per year.

New York City now uses as much electricity for charging purposes alone as cities like Binghamton or Cambridge use for light, heat and power purposes. What one city can do, other cities can also do, even if not always on so large a scale. But there can be no doubt that the scale will be sufficiently large to make it profitable for the Central Stations in the locality.

The business firms in our cities are showing their appreciation by increasing purchases of electric trucks. The Central Station people should not show less enthusiasm than the people outside of their own industry. Let us all get together then for the advancement of the electrical industry and success is bound to follow. In the returning prosperity the electric motor truck is sure to share largely. Those who are identified with it, whether as manufacturers or in Central Station capacity, will reap the financial benefit and reward.

NATIONAL ELECTRIC TRUCK SHOW

Westinghouse Motors and Controllers

THE Westinghouse Electric and Manufacturing Company, East Pittsburgh, Pa., manufactures motors, resistors, controllers and switches for use on electric vehicles, as well as complete charging equipment for charging vehicle batteries.

One of the accompanying illustrations shows a sectional view of a vehicle motor and illustrates the general construction. The frame is made of cast steel. For some smaller sized motors, the frame is made of rolled steel. The end housings are usually malleable iron and carry the ball bearings which are used to support the armature shaft. In special cases, the housing is made of cast steel or an aluminum alloy. The illustration also shows the large grease pocket around the ball bearings and the methods taken to protect the armature from grease.

The brushholders are designed so that the carbon will exert a uniform pressure on the commutator throughout the life of the carbon. A soft graphitized carbon, which has a low resistance and low contact drop, is used. The carbon has a shunt to carry the current from the carbon to the holder, so that very little current passes through the finger or spring to affect the life of the spring. The brushes are usually mounted on neutral. If desired, they can be given a lead so as to be in the position most favorable for commutation when the motor is running in the direction which corresponds with forward motion of the vehicle.

The poles are made of laminated steel riveted together. The field coils are wound of rectangular copper which are insulated and impregnated by the vacuum process to make the coils moisture proof and which, by eliminating all air pockets in the insulation, promote rapid dissipation of the heat from the interior of the coil and the elimination of hot spots. The field coils are arranged in pairs to allow series and series-parallel connections.

The armature is the slotted drum type. The armature punchings and the commutator are assembled on a spider, the use of which allows the shaft to be removed without affecting the windings or the commutator. The armature coils are held in slots by bands in grooves below the surface of the core and the coils are carefully insulated, the insulation being thoroughly varnished. After the coils are placed in the armature, the armature is baked to warm and dry it and then dipped in baking varnish so that all cracks and crevices are filled; it is then baked to dry the varnish.

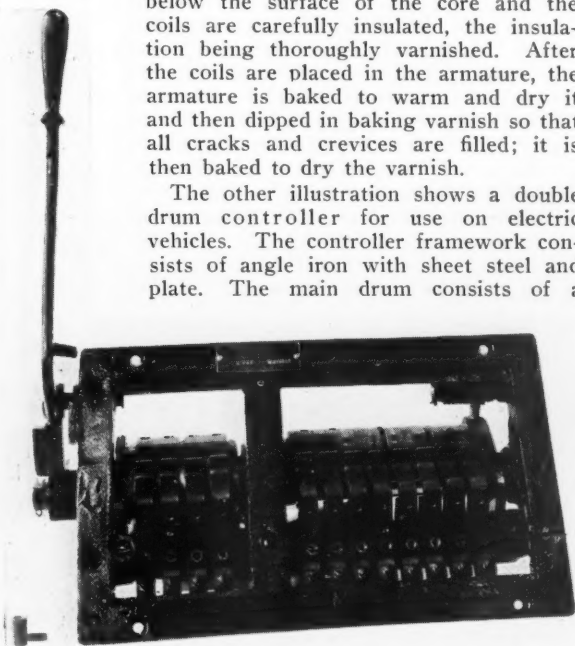
The other illustration shows a double drum controller for use on electric vehicles. The controller framework consists of angle iron with sheet steel and plate. The main drum consists of a

micarta drum on which the copper contacts are mounted. The copper strap fingers are mounted on a wooden base support, supported from the controller end plate. This finger base support is located at the side of the main drum which allows the fingers to operate on top of the drum when the control is mounted in the normal horizontal position, and faces the contact fingers and terminals so that they are readily accessible from the top of the controller. The location of the fingers on top of the drum also allows the arc to rise away from the drum and reduces the burning of the copper contact to a minimum. A pinion, which meshes with a sector of a gear on the controller handle, is located on the end of the main drum shaft, which extends through the end plate. With the arrangement, a slight movement of the handle produces more angular motion of the drum.

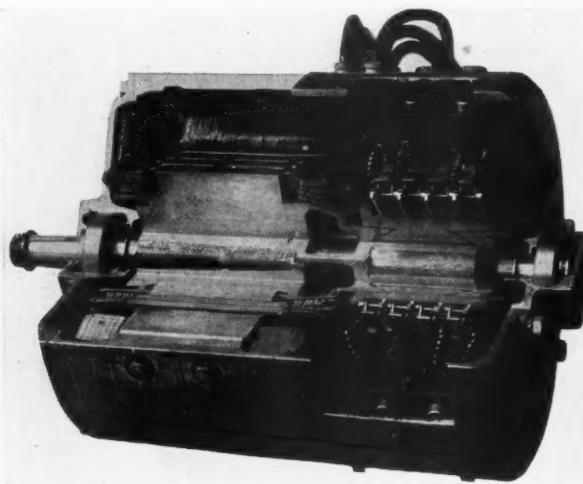
The reverse drum and fingers are of the same construction as the main drum and its fingers. The reverse drum is ordinarily operated from a pedal. It is normally held in the closed position by a spring, and is interlocked with the main drum handle so that it cannot be operated when the main drum is in any position except the "off" position. There is also an interlock preventing the operation of the main drum unless the reverse drum is in either the forward or reverse position. To reverse the vehicle, the controller is thrown to the "off" position, and then the reverse drum pedal is pushed against the action of the spring and the main drum is then operated in the same manner as it is for forward operation.

This controller is designed to commutate the battery and for field control of the motors. On the first three steps of the controller, the battery is divided into sections which are connected in parallel. On the last two steps, the two sections of the battery are in series. On the first, second and fourth notches, the fields of the motor are in series, and on the third and fifth notches, the fields are in series-parallel. The first notch is the only resistance notch, and the other four notches give efficient running speeds. This type of control reduces to a minimum the losses during acceleration, or in slow speed running.

The Westinghouse Company also manufactures controllers of the single drum type which do not commutate the battery and which therefore, have more resistance steps in the control. The general construction is the same as that of the double drum control except that only one drum is required.



Westinghouse Double Drum Controller for Use of Electric Vehicle



Cutaway Illustrating the General Construction of the Westinghouse Motor

NATIONAL ELECTRIC TRUCK SHOW

Battery Charging Equipment for Electric Trucks

BATTERY charging equipment plays a very important part in electric truck service. The charging requirements of the electric truck user of today are many and varied. There is the large manufacturer with a fleet of twenty or thirty trucks. There is the small store with only one or two trucks.

Obviously each condition requires a different type of charging equipment. The General Electric Company, through its Engineering Department, has made a careful study of the entire problem and is prepared to furnish suitable charging equipment to meet practically any condition encountered in electric vehicle service.

The following is a description of some types of charging equipment commonly used. Due to limited space this description is necessarily brief.

Charging Equipment for a Single Truck

When only one truck is charged at a time, the General Electric Company recommends an individual "Taper Charging" set. The motor-generator consists of a standard induction motor and a special type of generator designed to operate at the battery voltage and to deliver a tapering charge starting at high rate and finishing at a low rate. This is acknowledged to be the best method of charging a lead type storage battery.

A compact and reliable control panel is furnished with these sets, which operates in conjunction with the ampere-hour meter on the truck and automatically shuts down the set on completion of the charge, as indicated by the ampere-hour meter.

Equipment for Charging Two or More Trucks

When two or more trucks are to be charged simultaneously it is customary to furnish a single motor-generator set of sufficient capacity to handle all the batteries. (Two sets in parallel are sometimes used in very large installations.) These sets are of standard construction. The generators are compound wound and designed to operate at a voltage equal to the maximum charging voltage of the batteries. Generators of proper voltage can be furnished for use with any size or type of battery ordinarily used in electric vehicles.

With the motor-generator there should be furnished a control panel. This is usually of the sectional type, consisting of a generator control section and a separate charging section for each battery to be charged. Charging panels are divided into two broad classes, depending on the method of charging to be employed. The older and

more commonly used method is known as the "series resistance" or "constant current" method. An adjustable resistance is connected in each charging circuit for controlling the charging rate. This arrangement is necessary where the trucks are equipped with batteries of different capacities.

When all the trucks have the same battery equipment it may be desirable to employ the "modified constant voltage" system of charging. This is a newer method and is being strongly recommended by battery manufacturers. Briefly, the system operates as follows: The generator delivers a constant voltage. (This voltage is determined by the number of cells per battery. A small fixed resistance is connected in each battery circuit. This gives a tapering charge, starting at a high rate on a fully discharged battery and finishing at a low rate. It is a quick method of charging and at the same time the rate is controlled automatically by the state of charge of the battery and therefore requires no manual adjustment or "guessing" on the part of the operator.

Charging panels are further subdivided according to design; i. e., automatic or non-automatic. Fig. 1 shows a two-circuit "series resistance" type charging panel, designed to operate in conjunction with the ampere-hour meters on the trucks. Each battery is automatically cut off on completion of charge and when the last battery is cut off the motor-generator automatically shuts down. This panel is of the sectional type, permitting the addition of more charging sections should the number of trucks be increased at any time. Fig. 2 shows a 20-circuit panel of the non-automatic type. This equipment would ordinarily be under supervision of experienced battery man, who would adjust the charging rate on each battery according to its needs and disconnect it on completion of charge.

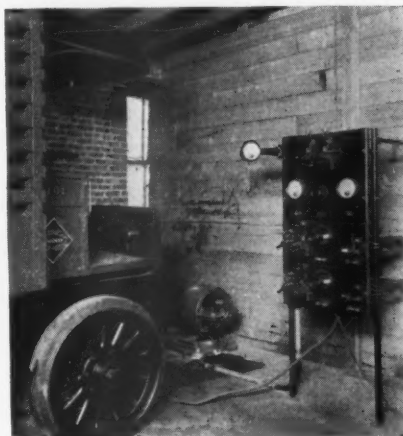


Fig. 1. Motor-Generator and Two-Circuit Control Panel for Charging Two Electric Trucks

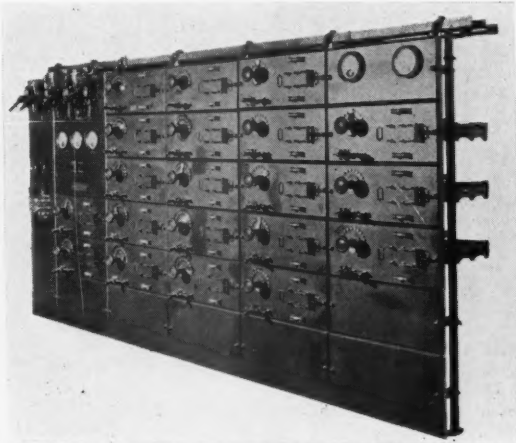


Fig. 2. Sectional Switchboard for Charging a Fleet of Twenty Trucks. In Use at a Large Western Bakery

The General Electric Co. is bringing out a new charging panel known as the "dead front" type. The operation is the same as previously described, the principal difference being in construction. The panel is of steel and all live parts are enclosed, thereby eliminating any danger of shocks to the attendant or employees working in the vicinity. The new "dead front" panel embodies all the most modern methods of switchboard construction.

NATIONAL ELECTRIC TRUCK SHOW

C-H Charging Equipment for Electrics

WITH the development of commercially practicable battery-driven vehicles during the early part of this century, the engineering force of The Cutler-Hammer Mfg. Co., of Milwaukee and New York designed rheostatic charging equipment which has been augmented and re-designed from time to time to meet requirements.

The equipment now made is of the unit type so that small and large fleets of street trucks, factory industrial trucks, and battery locomotives can be provided for. Each unit is complete in itself, alike in size arranged to be mounted on floor panels, from one to six being accommodated on each panel, several of which may be installed side by side or located according to space available.

Constant Current and Constant Potential Charging

Where an attendant is available, the constant current type of charging is used to the greatest extent, the resistance in the charging circuit being varied by the attendant by means of the slider handle on each charging unit. As the battery voltage rises during charge, resistance is cut out so that the current rate in amperes is kept approximately constant.

With the C-H modified constant potential system, the trucks when connected to the charging plugs have their batteries in circuit with the electric charging line through one step of resistance. This causes a fairly high inrush of current at the start followed by a gradually diminishing current as the battery voltage rises.

A prohibitive initial current is prevented because of the step of resistance, while at the close of the charge this same resistance insures a better charging current than if no step of resistance were used.

No manipulation of the rheostat handle or regulation of the charging current is required. To charge, the battery is simply connected to the charging plug and the instrument switch on the panel is closed. An ampere-hour meter on the truck cuts off the current automatically when the battery is charged.

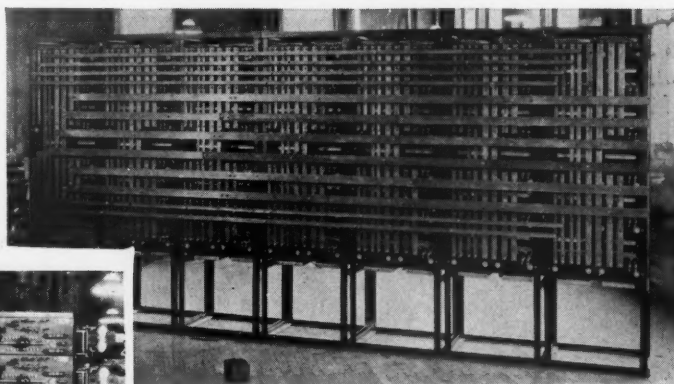
Full automatic equipment of this type is similar except the attendant is even relieved of the job of closing the main switch. He only needs to connect his truck to a charging plug, a magnetic switch in place of the hand-operated main switch automatically closing the charging circuit when a truck is plugged in.

Truck Controllers

C-H controllers are also made for electric trucks, the construction of one type being similar to the drum type controllers used in steel mill service, with heavy non-stubbing contact fingers to withstand the hard continuous duty requirements of electric trucks.



Forty-two Panel Charging Equipment Complete. The Incoming Service Lines and Meter Are Shown to the Right.



Front and Rear View of C-H Equipment of Forty-two Charging Units. Note the Neat Arrangement of the Bus Bar Connections

NATIONAL ELECTRIC TRUCK SHOW

Wotton Battery Charging Equipment

THE Electric Products Co., Cleveland, Ohio, manufacturers of battery charging motor-generators and rheostats, switchboards, vehicle motors, etc., is on the market with such a complete and representative line that any need can be accommodated. A full line of equipment for charging batteries from both alternating and direct current lines is provided.

The following is a brief outline of some of the units supplied.

One of the Wotton line, the type AFCX-100 automatic reducing rheostat, is shown in Fig. 1. A main fused line switch controls the entire charging unit. The reclosing circuit breaker in the upper left hand corner closes automatically as long as a line voltage is impressed upon its shunt coil. It will open automatically in any case where the current tends to reverse due to an interruption in the power supply. It is automatically reclosing at the termination of the interruption. The shunt trip breaker shown at the top of the panel in the center operates from the zero contacts in the locomotive type Sangamo ampere-hour meter when located on the truck. This terminates the charge when the battery is full.

The Solenoid switch shown in the lower right hand corner of the panel opens whenever the gassing contacts on the locomotive ampere-hour meter mounted on the truck have functioned. This breaker is held in against gravity. Therefore if there is a failure on the line anywhere this breaker will open automatically and restore the finishing rate of the battery. The contacts of this breaker simply short circuit or open a part of the fixed resistance in the line.

The horizontally mounted switch at the bottom of the panel is the boost switch, whereby sufficient resistance is cut out to charge the battery at approximately twice its normal rate.

For lead batteries whose counter emf nearly approaches the voltage of the line, the rheostat shown in Fig. 2 is recommended. The taper is obtained without the use of automatic means.

A few cases have been encountered where two lead batteries in series will be of approximately the proper voltage for charging from a direct current line. For such an installation as this, the equipment shown in Fig. 2 is modified to conform with that shown in Fig. 3.

There are a great many cases when it is desirable to save the resistance losses in the charging of a low voltage battery from a high voltage line. Such an outfit as shown in Fig. 4 accomplishes this with a great reduction in current losses. The voltmeter of the combination type gives the individual readings; the circuit breaker under the cover is controlled by the ampere-hour meter located on the truck. The single pole switch simply controls the exciting coil on the circuit breaker. The current limiting relay and field rheostat complete the equipment.

Fig. 5 shows the standard equipment for a two circuit outfit. For a one circuit outfit, the lower sectional unit would be omitted, leaving the two top ones as shown.

The two circuit breakers on the upper panel are so arranged that in case of line interruption the circuit will be opened between generator and battery and upon resumption of the power supply line it will automatically close and the batteries put on charge. A field rheostat and a combination voltmeter complete the upper sectional unit, except that the upper circuit breaker will open permanently as soon as the individual shunt trip breakers on the lower sectional unit panels have both of them finally opened. This shuts down the motor-generator permanently after the last battery has gone off.

Each individual sectional unit comprises a locomotive type Sangamo ampere-hour meter of the single contact type. This instrument may be removed if desired and mounted on the truck itself. In most cases it is desirable. The shunt trip breaker to the left of the meter provides the automatic cutoff at the termination of the charge of each battery.

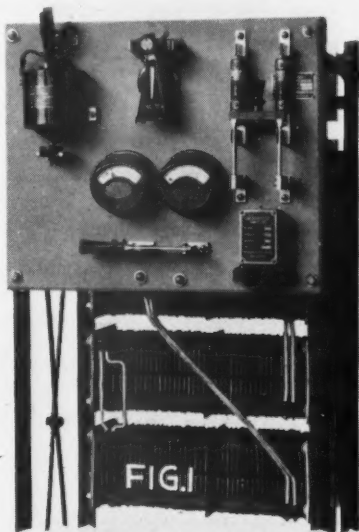


FIG. 1

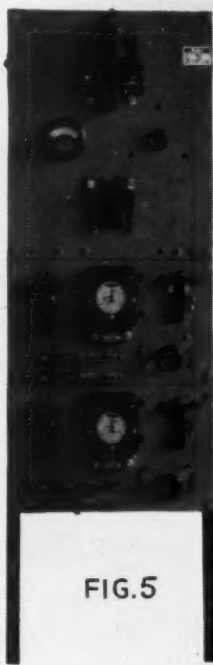


FIG. 5

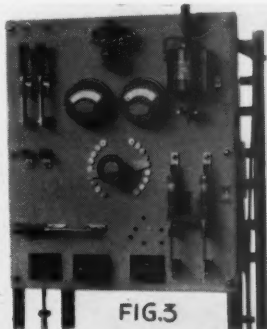


FIG. 3

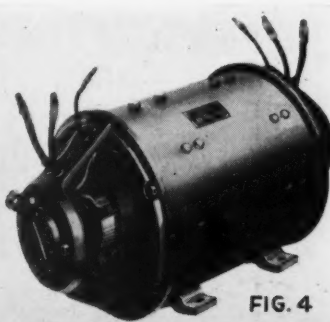


FIG. 4

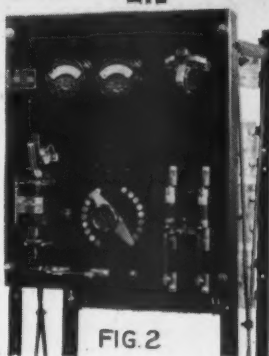


FIG. 2



FIG. 4

NATIONAL ELECTRIC TRUCK SHOW

G E Electric Vehicle Motors and Controllers

THE following is a brief description of such equipment of the General Electric Company as is particularly adapted to the electric truck, both the road and industrial types.

Experience has shown that an electric truck motor must combine a number of special features which are not met with in motors for other purposes. Mounted either on the body or driving axle of the truck, it must be light and yet have a frame of great strength to resist road shocks. It must also be nearly dust and water-proof. As the motor is to be driven by energy from a battery, it must have high efficiency not only for normal load, or level running, but for an overload of 300 per cent, or perhaps 400 per cent, which is made necessary by steep grades, deep snow or bad roads. All of these qualities are embodied in the motors built by the General Electric Company.

The frames of these motors are designed for adaptation to special requirements. They are of cast steel or wrought iron, for different sizes and types, machined throughout their entire length and drilled for mounting requirements of each application.

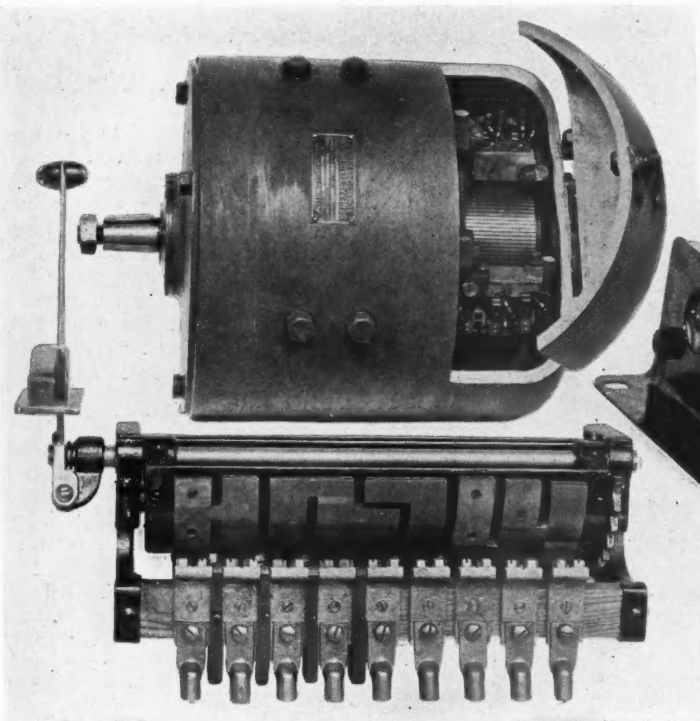
High efficiency is obtained by painstaking electrical design, the selection of special materials for the complete magnetic structure, and also, for all conductors. Friction is reduced to a minimum by the use of small diameter commutators and anti-friction bearings. The latter have the additional advantage of reducing the overall length of the motor. Rectangular copper is used in the windings of the armature and field coils, and the commutators are also built up of special roller copper. Another important detail is the composition of the

brushes. Other features lie in the accurate balance and the special banding of the armature, which are required not only for normal operating speeds, but particularly when a truck is allowed to coast down a steep hill. For protection against dampness and high overloads the field coils have been impregnated in asphaltum and all parts of the armature windings and commutator have been thoroughly insulated.

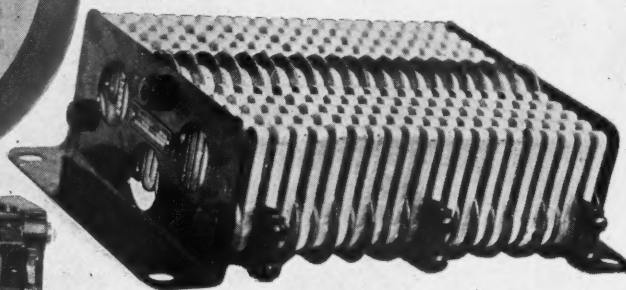
Two principal types of automotive controller are made by the General Electric Company: one direct connected, as shown in Fig. 2. This is used mostly for electric trucks of various sizes. The other form has a solid, cylindrical drum, requiring the use of a gear and pinion in its operation. This is employed mostly for lighter trucks. Both controllers are adapted to what is called continuous torque operation, which is simply another way of saying that the contacts are so arranged as to prevent sudden jerks on the driving mechanism.

The automotive equipment is completed by a resistance unit, consisting of cast iron grids, suitably insulated from each other, and provided with terminals for connection to the controller and motor.

All that has been written here is of a general character, but the General Electric Company has developed motors, controllers, resistances, and in fact all electrical equipment for the propulsion of battery operated vehicles of all sizes and for all purposes. This, of course, means a great number of combinations of magnet frames and electrical ratings to meet exact requirements. These, as a rule, are highly special, requiring the services of trained engineers in order to obtain the best results.



Upper Left: Access is Afforded Through a Segmental Hand-hole Cover Hinged at Commutator End



Lower Left: Direct Connected Drum Controller

Lower Right: Cast Grid Resistance Arranged for Horizontal Mounting

NATIONAL ELECTRIC TRUCK SHOW

What the Dealer Should Know About Electric Vehicle Battery Charging Apparatus

By C. P. SHATTUCK

THE source of energy or power required for propelling the electric truck is a storage battery. When the battery is discharged it must be recharged. When the layman sees 8, 12 and 20-circuit charging boards and other equipment employed to charge batteries of a fleet of trucks he gains the impression that here is a complicated, highly technical electrical layout requiring experienced electricians to obtain results. This confusion is only the result of unfamiliarity with the names of the components or units.

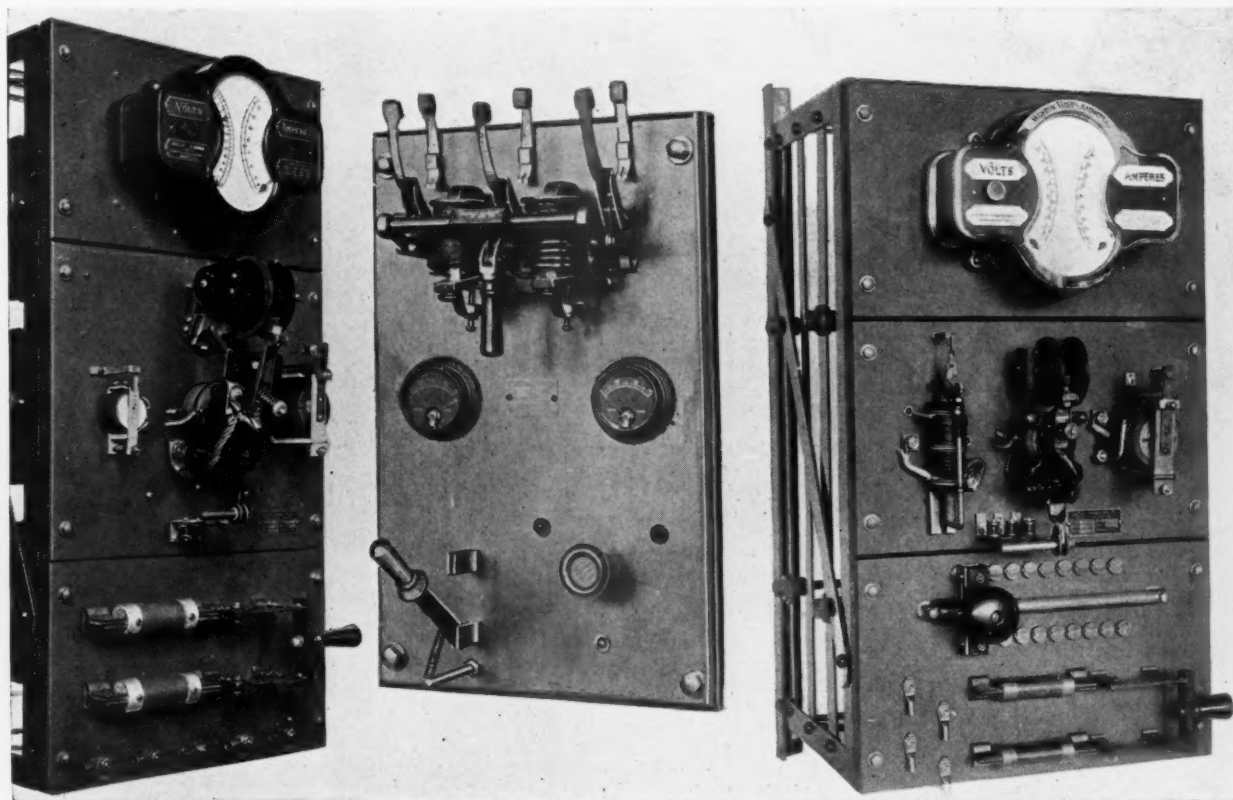
Stripped of their technical names and their functions explained in simple terms which the layman can understand, the units and component parts are no more complex than the starting motor, generator, cut-out or current regulator and battery employed for starting, lighting and ignition in the gasoline car or truck. Some electrical authorities state that the charging equipment employed with the electric truck storage battery is more simple.

A simple explanation and an analogy of the SLI battery (starting-lighting-ignition) given by an electrical expert is repeated in substance because of its simplicity.

"The SLI battery supplies current to the starting

motor and the motor cranks your engine. A certain amount of juice is used up in the process. To replace this you have a generator on the engine which charges the battery. There is also a device which controls the current from the generator to the battery, cutting the battery in and out and regulating the current to a certain extent. Now if the engine is cranked long enough and no charging done the battery will run down. Generally it is taken out and sent to a charging station, called the battery service man. He charges the battery. Some car owners buy a charging device, a simple unit which can be plugged into an ordinary lighting circuit. They are not electrical experts. They do not have to be, for the charging device does the work without other than ordinary attention.

"This charging device changes the alternating current of ordinary lighting circuits to direct, which must be used for charging a battery and regulates the right rate of charging. Now the electric truck employs a battery for 'cranking' the rear wheels, as it were; it energizes an electric motor which functions similar to the starting motor on the gasoline car, but there is this difference.



Left to Right: The Cutler-Hammer Automatic Charging Panel, an Individual Type; the Automatic Panel Employed With the G. E. Motor-Generator Set and Which Ends Charging When Battery is Charged; the Cutler-Hammer Individual Charging Panel for Wall Mounting

NATIONAL ELECTRIC TRUCK SHOW

There is no generator in the electric truck, hence the battery is recharged when necessary.

"All storage batteries must be charged at a certain rate, which rate is generally recommended by the maker. The charging rate depends upon the type, size, capacity, etc. This rate is given on the name plate of the battery, but the equipment employed for the electric vehicle battery is just as simple, even more so than that used for the SLI battery.

"There are various kinds and types of equipment employed for charging the truck storage battery. Eliminating the different makes and getting down to the types, these are several because we have two kinds of current supplied by the lighting and power companies, i. e., direct and alternating. There are also different voltages in the various sections of the country. Therefore, we have equipment to change the alternating current into direct, which must be used in charging any battery and for controlling the rates, i. e., the starting and finishing rates of the charging process. But the dealer merchandising electric trucks or the owner employing them, need have no concern as to these details or technicalities, for the various manufacturers of charging and control equipment provide a service which was outlined in the writer's previous article dealing with the storage battery for electric vehicles.

But the dealer selling electric trucks naturally is concerned as to how to advise his prospects when the subject of charging the battery is brought up. If the city or town has a garage with charging facilities the charging question becomes a simple matter. The dealer need only recommend the electric station to the purchaser or inform the prospect of the service. The majority of the larger cities have such service where for a fixed and reasonable sum battery service is purchasable.

On the other hand, the buyer may desire to install his own charging equipment. Naturally he will consult the

dealer handling the electric truck. Again the dealer does not have to familiarize himself with the technicalities of the subject, for there are several concerns which maintain branches in the cities or will send experts who will advise the dealer as to the requirements of the truck buyer. These men will ascertain what equipment will be best and see to it that the same is properly installed and operated. All makers of charging apparatus render such service.

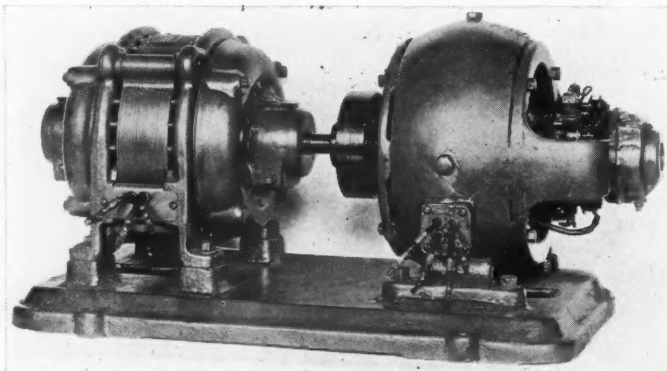
Even if the electric truck buyer starts with one vehicle

he could install at a reasonable cost the equipment for servicing his battery. Equipment for this purpose is shown in an accompanying illustration and is termed a motor generator set. It can be employed for charging both Edison or lead batteries. These sets are made to care for either single-phase or polyphase alternating current circuits, or direct current circuits of standard voltages. The operation of the set is simple. After inserting the charging plug in the receptacle of the vehicle the switch is closed. No further attention is

required until the battery is charged, at which time the switch is opened. Where proper attention cannot be given to the charging operation an automatic panel can be employed. This device automatically stops everything on the completion of the charge.

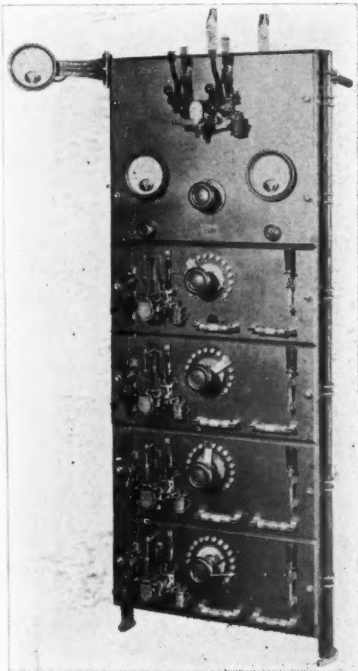
Another individual type is the single circuit design which is also shown herewith. This type occupies but little space, being arranged for wall mounting. It is automatic in that it adjusts failures in the line voltage or where it falls to such a point that there is danger of the battery discharging back into the line. A time switch can be employed so that with this equipment charging is easy and simple for the truck owner.

Assuming that the prospect decides upon one truck with the likelihood of eventually adding more he would instead of investing in a single charging equipment invest in a six-circuit panel. This is really six of the single panels combined in one, and, of course, permits of charging from

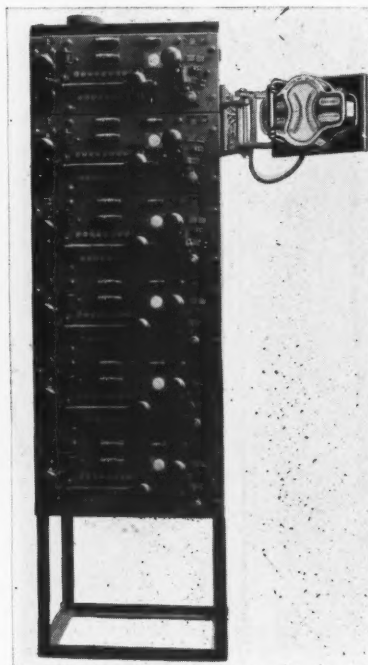


A Motor-Generator Set Made by the General Electric Company and Employed for Charging One Battery

This equipment can be easily installed by the dealer when demonstrating and making a cost analysis as is done by the Ward truck dealers



Switchboard With One Standard Generator Section and Four Charging Sections Arranged as One Panel.



Cutler-Hammer Six-Circuit Panel

NATIONAL ELECTRIC TRUCK SHOW

one to six batteries. Similarly there are panels, of 8, 12, 18 circuits, etc.

The writer has made no attempt to discuss the various equipment nor the measuring instruments or the charging rates. The more the dealer interested in electric trucks delves into these details the more confused he is apt to become. There are several well-known manufacturers of charging equipment, and supplying charging outfits for use in connection with one truck or a fleet and as these concerns have branches in the various cities and men to analyze requirements, it is not necessary for the dealer to master the details, but he should know the generalities at least and be able to advise the owner as to charging. As has been pointed out, there is the public garage or electric charging station where service will be rendered. Or, if the purchaser desires to do his own charging, the dealer can submit estimates by calling in the representative of the charging equipment maker. The dealer in electric trucks has available, sufficient data and information supplied by the electrical interests to simplify the battery charging question when it is brought up by the prospect.

In connection with the charging equipment there should be an opportunity for the dealer to add to his profits through the discount allowed the dealer by the equipment manufacturer. Some manufacturers allow the dealer a discount when selling and recommending charging equipment to his customers and the makers also cooperate with the dealer.

In summing up, the dealer interested in taking over a line of electric will be assisted by the charging equipment makers as well as the battery manufacturers in supplying practical information as well as sales data. As has been previously stated the dealer has no need to know the technical details nor will the customer be interested. What both desire is to know if a certain piece of equipment will do the work, do it properly and with the least attention. The technicalities can be left to the engineers, but suggestion is made to the dealer to avoid use of technicalities when explaining the charging to his prospect and to see that the electrical expert does likewise when called upon to visit a customer. The more simply the proposition is laid upon the table the less sales resistance will be experienced.

Allen-Bradley Battery Charging Panel

THE Type L-2120 battery charging panel was designed by the Allen-Bradley Co., Milwaukee, Wis., manufacturers of electric controlling apparatus for charging automobile starting, lighting, ignition or other small storage batteries from direct current circuits. It is made in two sizes. The smaller size is for charging from 32 volts, direct current, such as is generated in most farm lighting plants. The larger size is for charging from 115 volts or less, direct current. By the addition of a specially designed separate resistance to be connected into the circuit with the larger panel, it may be used for charging from 230 volts or less.

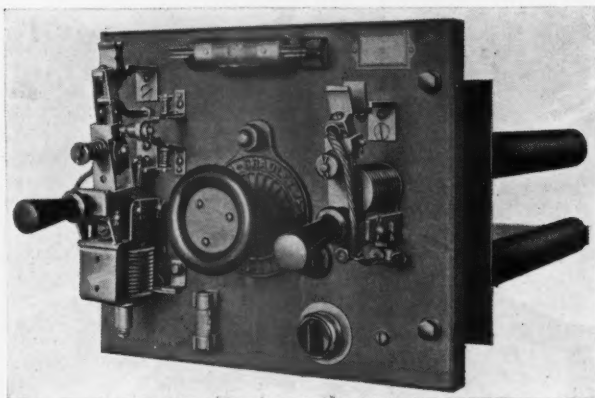
Each panel provides for one charging circuit and consists of a marine finished slate panel on which is mounted a graphite compression rheostat, a 30 ampere double pole circuit switch, two 15 ampere fuses, and a high grade ammeter with a 15-0-15 ampere scale. The slate panel, switch, fuses and ammeter are identical in the two sizes. The rheostat is mounted on the back of the panel, and is supported by the bracket which also holds the panel on the wall or charging bench. On the smaller sizes the rheostat is of suitable capacity for charging from 32 volts, while the larger size is provided with a much larger rheostat for charging from 115 volts, or 230 volts as explained above.

Any number of batteries from one up to the full num-

ber possible with the available line voltage can be charged in series at any desired rate up to 15 amperes. The resistance of a compression rheostat varies with the pressure exerted on the column of disks and since this pressure can be exerted to any desired degree by means of the handwheel, absolutely smooth and stepless control of the current can be obtained, regardless of the number of cells on charge. Entire absence of sliding contacts, contact buttons and complicated wiring are exclusive features of the compression rheostat. By a simple change in connections either size Type L-2120 panel is suitable for discharging batteries for repairs, with discharge currents up to 15 amperes. The ideal arrangement is to maintain a separate size 2-panel for this purpose, where both charging and discharging are regularly required. This panel will discharge 1 to 5 batteries in series.

This Allen-Bradley Unit Panel in combination with any number of similar standardized panels, increases the capacity of a charging board indefinitely.

One section contains a maximum of six unit panels with a swinging meter panel, or five unit panels and one meter panel, mounted upon a standard frame. When additional charging circuits are required, unit panels may be added until the frame contains six panels, after which the capacity of the board is increased by adding one or more standard section frames.



Allen-Bradley Type L-2120 Charging Panel

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Charging Electric Truck Storage Batteries is a Very Simple Operation

The following information is extracted from an address made by Mr. Otto Sarvas, of the Devices Electric Corporation, of New York, before the New York Electric Vehicle Association School. This address outlines the operation of those units needed for charging batteries in non-technical language

NO one knows just exactly what electricity is. Mr. Edison or no one else has been able to see electricity or to find out definitely what it is. We know some of its properties, we know how it acts under certain conditions, but we do not know what it consists of. Perhaps, one of the best ways to explain the workings of electricity is to compare it to water. Electricity acts in many respects precisely the same way water does. For that reason, I will compare an electrical circuit with a water circuit, so that we will obtain a clear conception of just what is taking place when charging a battery or when operating a charging board.

Another good analogy for the battery is the gasoline tank. A storage battery is a tank or compartment for storing electricity, just as the gas tank stores gas. The current for the battery is taken from a bigger tank supply and put into the small tank of the battery. With the battery mounted in a truck this stored up energy is gradually fed into a motor the same way as gasoline is gradually sucked up into the engine of the gas car to drive the engine. To illustrate more clearly, a gas car drives to a gasoline pump station to replenish its supply of power. The amount of gasoline put into the tank is registered by a gage on the gas pump, also the gage on the gas tank. This gage shows when this tank is approximately full. If the gage is not functioning or where there is no gage, the operator must be careful not to waste any by overflow. When charging a battery, the charging plug is taken and inserted into a receptacle in the car, the charging plug corresponding to the hose of the pump. The amount of electricity put into the battery is shown by an ampere-hour meter on the truck. The battery has a certain capacity for storing energy analogous to the capacity of a tank for holding gasoline. If more electricity is put in than the battery can hold, it is wasted and is just as much of a waste as gasoline overflow. In gravity feed systems of gasoline cars, a low gasoline supply prevents the carburetor from functioning properly, the result is similar with a battery, when the battery capacity runs low, the motor will slow down.

Difference Between Volts and Amperes

The next thing I want to bring out is the relation between volts and amperes. The ampere is the rate of flow and the volt is the pressure which causes the current to flow. For purposes of explanation, we have two tanks, a large supply tank and a small battery tank. If these two vessels were filled with water and placed on the same level, water would not flow through a connecting tube from one into the other because there is no pressure to force this water from one vessel into the other, but if the vessel called the battery tank was lowered the water would immediately start to flow upon opening the cock. The rate or speed of flow of this water, from the supply tank into the battery tank, is proportional to the pressure of the water and the pressure is the difference between the water levels in the two tanks.

The unit of electricity current or flow is the ampere, and the rate at which the amperes flow is proportional to the pressure of the voltage, the higher the voltage the faster the current will flow, just as an increase in pressure of the water in the supply tank will increase the rate of flow into the battery tank.

Charging the Battery

Of course, electricity is vastly different from water, but the properties of the electrical current are to a great extent similar to those of water. Now then, let us come back to the comparison of buying gasoline for the tank with buying electricity for the battery. Let us assume that the tank in a Ford car has a 12 in. gasoline filler opening. If the pumping station has a nozzle which has an inch opening, plainly it can not be used to fill the Ford tank through its $\frac{1}{2}$ in. opening. To attempt it would cause a great waste. Furthermore, with a $\frac{1}{2}$ in. nozzle on the hose, the opening in the Ford tank will be taken up entirely by the nozzle and will not permit air to escape from the tank as the gas is put in. Again, if the gasoline is forced through the nozzle too fast, bubbles will form in the tank and some of it will overflow preventing filling the tank to capacity.

Now in the case of the battery; first of all, if the plug from the charging board or the electrical supply of the charging station is not suitable for the battery, current can not be made to flow into the battery. The next thing is, what will happen if current flows at too high a rate into the battery? We all know, that when charging a battery a certain amount of gassing takes place. This gassing, however, is entirely different from the air bubbles which form in the gas tank but the result is the same. If current is forced into the battery at a too high rate, gassing immediately starts with the result that the battery cannot be filled to capacity. If it is attempted the battery will be injured because the current is being forced into the battery faster than it can absorb it. This then explains why batteries should be charged at the rate recommended by the battery manufacturer. Of course, it is not necessary to stick exactly to this rule, a little higher or lower rate will not matter particularly but any large deviation is apt to injure the battery. This does not apply to boosting. By boosting is meant that most of the battery capacity is gone and a quick charge is necessary in order to continue a trip.

Although a battery will start gassing immediately when boosting, a comparatively small quantity of electricity is being put into the battery, consequently, it is able to absorb the current without difficulty and no current waste or harm is incurred.

Discharging the Battery

Referring to the gasoline analogy in connection with the discharge, the amount of gas taken from the tank cannot be more than the tubing can carry. With the battery though there is a different condition, the wiring from the battery to the motor is designed to carry a certain amount of current, but if more current is being

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burned than required for accomplishing certain work the wires will heat up because the motor is taking electricity too fast from the battery. Therefore, the wiring is made to do more work than it is designed for.

The next point is what happens when the rheostat is adjusted on the charging board, or when it is manipulated in any way? Let us again compare the battery charging switchboard with the gasoline pump. After the plug has been inserted into the receptacle, the switch is closed and the current starts to flow. By closing the switch a tap is opened, permitting the flow of electricity. The speed of the flow is controlled by a rheostat. Turning the rheostat handle all the way means that the current will flow fast, and half way, current will flow more slowly. Where no rheostat handle is provided the rate of flow has been adjusted by the manufacturer of the switchboard.

When charging a battery the first thing to figure out is how much current you should put in it, and next how fast you want to put it in. The quantity of current can be determined by the ampere-hour meter on the truck, or where no ampere-hour meter is provided apply the rule of charge for a specified number of hours. In the case of a lead battery, a hydrometer will give an indication of how much current is required to bring the battery up to capacity. The rate at which the battery is charged is clearly specified by the manufacturer of the battery; in most of the cases the battery plate is marked, showing the starting and finishing rate. As a general rule, a lead battery can be charged at a low rate safely without danger of hurting the battery by overcharging.

Care of Storage Battery

To my mind, a storage battery can be properly cared for by following rigidly two or three rules without experiencing any trouble. One of them is to charge the battery at the proper rate; the average switchboard that is built for charging batteries is very nearly foolproof and will give you the desired rate without difficulty. The next rule is to properly replenish the battery with water. See to it that the water is over the top of the plates. This is about all that is required of the average battery operator.

How can one determine without a meter whether a battery is fully charged or not? The most reliable method is to use an ampere-hour meter, which, when kept in proper shape, will show at all times the condition of charge in the battery. These meters are very plain and will indicate at all times the condition of the batteries. A harder problem is to find out how long to charge the battery when no meter is on hand or, if the meter is out of order. In the case of a lead battery a hydrometer may be used it will give a fairly correct indication and the battery company instruction book will show what percentage of charge is required when the battery reading corresponds to a certain specific gravity. With an Edison battery, gravity reading cannot be taken, and an approximate method of determining whether the battery is fully charged or not is by the use of the voltmeter. The voltmeter shows the battery pressure. If all the batteries were in the same condition and were of the same age, a voltmeter would give a fairly accurate indication of the state of the charge in the battery.

The voltage of the battery will change the external temperature, it will be different in summer than in winter, it will change with the age of the battery, it will change with the state of electrolyte. Of course, when

charging the same battery night after night on the same plug, the operator will get eventually familiar with the readings that are obtained at a certain charging rate and will gradually be able to tell just what the condition of the battery may be. Some operators charge their batteries according to the daily mileage, from previous experience they know that a truck may cover fifty miles a day and return with a fully exhausted battery, consequently, the next day when the truck comes in after a twenty mile run they will only charge the battery two-fifths the length of time they have taken the previous night.

Discussing the Charging Switch Board

The charging switch board in its most simple form consists of a switch and rheostat. The switch for closing the circuit and the rheostat for regulating the flow of current. Rheostats are either adjustable or fixed or may be absent entirely. The switch is always provided, it may be in the shape of a circuit breaker, which is the name for a switch with some special protective feature, or it may be in any other shape but it serves the same object just the same. The rheostat regulates the flow of current, regardless of its shape, adjustments or make. Manipulation of the rheostat handle cuts in or out some of the resistance which makes up the rheostat, the more resistance the slower the flow of current will be. Resistance opposes or retards the flow of the current.

The charging board is very simple to handle and very few adjustments are required to keep it going for almost an indefinite period. Some boards are equipped with a pilot lamp. A pilot lamp is an electric bulb which serves to show that the battery is on charge. It is put on the board for the convenience of the operator to indicate at a glance when the battery is on charge. A circuit breaker other than its switch function may have various functions which are incorporated for safety to protect the battery.

Some circuit breakers open up when the battery is full, and others will not stay closed unless the plug is properly put into the receptacle. If a circuit breaker does not close or remain closed the cause in all probability lies in the loose connection or neglect somewhere. It should never be kept open or held closed forcibly with a piece of board. The fuses on the board, as we all know, are to prevent the excessive flow of current. A fuse is carefully manufactured and will allow a certain rate of current to pass and no more. It is for protection against personal injury in operating board and also to protect the battery. If a fuse blows something is wrong. After the trouble has been found the next fuse will not blow. The manufacturer puts the proper fuse in the proper circuit and the electrical contractor puts in heavy enough wires for a certain fuse and if more current is passed through that wire than the fuse permits the wire will heat up and is liable to cause fire.

What About Alternating Current?

Motor generators, converters, rectifiers, etc., is equipment used when the power company furnishes alternating current instead of direct current. What is alternating current? It is the same as direct current, except that the pressure or voltage alternates, or changes from one direction to another. This happens from 25 to 60 times per second. Now, in order to force current into a battery, it is necessary that the voltage of the charging station be higher than that of the battery, because if it is lower, the battery will force the current back into the line. With alternating current this pressure is all right for an instant, but in the next one the pressure decreases

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in order that it may reverse in the opposite direction. At this instant, if the battery is connected, the battery voltage will force current back into the power house system. Therefore, we will put back at least as much current as was received in the battery during the first instant, and for this reason, a battery cannot be directly charged from an alternating current system. The alternating current must first be changed into direct current, and this is what a motor-generator rectifier does. In a motor-generator, there are two distinct units. The first one is the motor, which is connected through a starter to the alternating current supply, which makes it rotate and drive the generator. The latter as the name implies, generates electricity. The generator furnishes "direct" current and this is what is used for charging the battery. In a rectifier the direction of the voltage is rectified.

Starters for motor generators are usually alike in operation; there are two positions, start and running. The lever should be left in the start position long enough to permit the motor to come up to approximately full speed. This may be from 5 to 30 seconds, then pull the lever rapidly in the run position and leave it there. The next operation is to permit the generator to build up the voltage which must be higher than the voltage of the battery to be charged. If this is not the case, the battery will back up into the generator, and in certain machines "kill" the field. By this is meant the following: A generator has a magnet, but instead of having a permanent one as in a magneto, which could not be made in such a large size, it has one that consists of a piece of iron surrounded by wire. When the current flows through this wire the iron becomes magnetized and this is what acts as the magnet. The magnet is necessary in order that the current may be generated in the generator. When the machine is started either a current or a magnet is needed to start the action, one being the result of the other. It so happens, that the iron used in a generator pole does not lose all of its magnetism when the machine is shut down but retains a little of this. This small amount is in turn sufficient to create a little electricity, which when flowing in the wire surrounding the magnet strengthens it until such time when the machine builds up to the full-rated voltage. Some machines build up their voltage faster than others and this may take from 30 seconds to 2 or 3 minutes. If the battery is hooked on before the voltage has had a chance to build up, the battery voltage will force current through the wire surrounding the magnet in the opposite direction to what it should be flowing and the magnetism resulting from this reversed current will oppose the little magnetism that was left over in the iron and kill it. The result will be that the voltage will not build up in the machine. If the machine is properly handled a reversed polarity will never occur. The switchboard equipment used with the motor generator sets are similar to those used on direct current installation.

There are many makes and types of charging equipment today. As a matter of fact, the individual manufacturers have several types of equipment to offer. These types are classified as to the type of service required, full automatic switchboard which terminates the charging without manual attention when the battery is full and there is the semi-automatic equipment which requires a setting manually but then terminates the charge at a predetermined time, and there is the non-automatic equipment which must be adjusted manually. Both the automatic and the semi-automatic equipment may be operated manually if so desired.

K. W. Battery Service

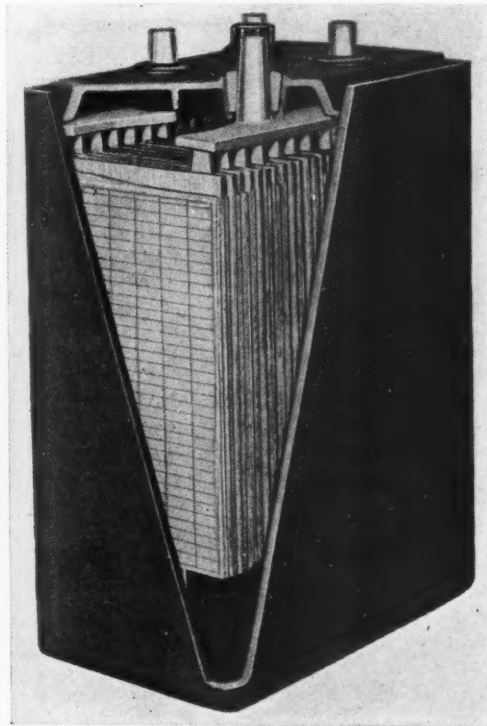
The K. W. battery for electric vehicles, manufactured in Chicago by the K. W. Battery Company, Inc., is unique in the manner in which it is merchandised. The business of the company was built upon the plan of renting batteries at a flat price per month. The rental plan was started in Chicago about nine years ago and proved from the start attractive to users of the electric vehicle and successful from the standpoint of the company, since the rental means continuous usefulness to the truck owner and the certainty of having a battery always in his car which will do the day's work. This rental service is being operated today in Chicago and New York.

As battery usage varies tremendously with different vehicle operators, it is, of course, not possible for anyone to state before hand with certainty just how long a battery will wear in a certain truck and just when it will be necessary to replace it. The problem is met by an "Exchange Agreement."

The battery is built of high grade materials in every respect and with the utmost care to make certain that it will operate throughout its useful life without incidental repairs and that when its service term is reached, a new battery may be supplied rather than any major repair undertaken. The user is, therefore, supplied with a contract by which the battery manufacturer fixes the price of an exchange battery and sets a definite series of percentages of this price at which an exchange may be made during the period covered by each particular percentage. The exchange percentage changes with each month of service.

This plan is applied to commercial trucks and electric passenger cars, industrial trucks and mine locomotives as well.

The battery is of the standard lead, acid type, of flat-plate construction with medium-thickness plates which has proven to be the form in which the best service can be given for the lowest possible maintenance cost.



Cutaway Cell of K. W. Battery Showing Heavy Plate Construction, High Ribs and Reinforced Molded Covers

NATIONAL ELECTRIC TRUCK SHOW

Electric Vehicle Schools to Give Instruction in Transportation Engineering

THE PURPOSE of these schools is to offer to electric light and power companies' sales representatives instruction in transportation engineering, and the construction, characteristics, operation and care, maintenance of electric trucks, batteries, motive and garage equipment, to prepare the students to organize and conduct electric transportation departments in their respective companies, to enable them to advise their customers in their transportation problems and by stimulating the electric truck load add to the income of their companies.

This course is free to such representatives. The classes are to be limited to fifty so that every student will be able to receive the very best schooling possible. Those delivering the lectures are experts in their particular lines.

THE COURSE—The course of instruction will include the following subjects:

TRANSPORTATION ENGINEERING—Survey, costs, analyses of conditions, field and advantages, comparative costs, selling talks and arguments.

TRUCKS—History of electric truck development, design, materials used, forms of power transmission, wheels, steering gear, brakes, tires, battery cradles, wiring accessories, industrial trucks.

MOTIVE EQUIPMENT—Motors, controllers, lighting, charging receptacles and plugs, ampere hour meters.

BATTERIES—History and development, types, construction, characteristics.

GARAGE EQUIPMENT AND OPERATION—Charging equipment, switchboards, care of batteries, chassis and bodies.

TRUCK OPERATING AND MAINTENANCE—Care on the road, how to secure best mileage results, lubrication, overloading, emergencies, driving rules and legal requirements.

Following the New York school one will be held in Chicago in June, under the auspices of the Commonwealth Edison Company.

Following the closing of the Chicago school all the papers and manuscripts will be gone over very thoroughly and then placed in booklet form, which will compose the most complete booklet ever printed of its kind. Next year these schools will be opened in such localities as they are desired. Already power companies on the Pacific coast are making inquiries as well as central station companies from the South.

The only expense to the students will be for traveling and hotel for the period of the course. For the ten days there should be allowed about \$100, in addition to car fare, and \$20 additional for those who take the inspection trips.

If more applications are received than can be accommodated in the first schools, additional schools will be conducted at a later date. Applications and further information can be secured from E. S. Mansfield, Chairman, Electric School Committee, 39 Boylston Street, Boston, Mass.

THE FACULTY of the schools, which has charge of preparation, presentation, and direction of the various features of instruction, is made up of the following well-known men:

H. S. Baldwin, General Electric Company.
 Wilton Bentley, K. W. Battery Company.
 A. K. Brumbaugh, Autocar Company.
 J. C. Carrol, Walker Vehicle Company.
 H. C. Dunn, Ward Motor Vehicle Company.
 William N. Fenninger, Brooklyn Edison Company, Inc.
 G. A. Freeman, Walker Vehicle Company.
 C. H. Greeff, Electric Truck Transportation Company.
 F. C. Henderschott, The New Edison Company.
 M. C. Huse, The Philadelphia Electric Company.
 Fred R. Jenkins, Commonwealth Edison Company.
 J. L. Lufkin, The United Electric Light & Power Company.
 E. S. Mansfield, The Edison Electric Illumination Co., of Boston.
 H. S. Meese, Commercial Truck Company.
 George H. Morris, Electric Storage Battery Company.
 R. P. Sanborn, Edison Storage Battery Company.
 Charles R. Skinner, Jr., The New York Edison Company.
 George Drake Smith, Steinmetz Electric Motor Car Corporation.
 H. B. Smith, Westinghouse Electric & Manufacturing Company.
 H. H. Smith, Philadelphia Storage Battery Company.
 J. H. Tracy, Electric Storage Battery Company.
 Maurice Walter, Walter Motor Truck Company.
 Charles A. Ward, Ward Motor Vehicle Company.
 E. R. Whitney, Commercial Truck Company.

Time and Place

The New York School to be held in the New York Edison Company Building, May 15 to 26, 1923.

The Chicago School to be held in the Commonwealth Edison Company Building, 72 West Adams Street, June 19 to 30, 1923.

NATIONAL ELECTRIC TRUCK SHOW

Some Facts and Figures Concerning the Electric Truck and the Industry

The Electric Truck is the most economical vehicle for short haul, frequent stop, city delivery work.

It costs less for current to operate an Electric Truck than it costs to feed a horse.

A vehicle census in the Borough of Manhattan, New York, of 2,172 vehicles showed that 72.7 per cent were horse drawn, 25.8 per cent gasoline trucks and 1.5 per cent electric trucks which indicate that there is a virgin field ahead of the electric truck and gas truck manufacturer.

The availability of electric current at one time was the drawback to the use of electric trucks. We are informed there are now more than 7,500 cities and towns in the United States, where current is supplied at 5 cents and less per kilowatt.

During the year 1922 the American Railway Express Co., in Atlanta, Buffalo, Chicago, Cleveland, Detroit, New York, San Francisco and Washington, D. C., operated 722 electric trucks which ran a total of 4,937,752 miles. These trucks performed better than 314 truck days per year, with less than two trouble calls per truck per year.

Public Liability Insurance rate is very low on electric trucks. The electric truck is free from fire hazards.

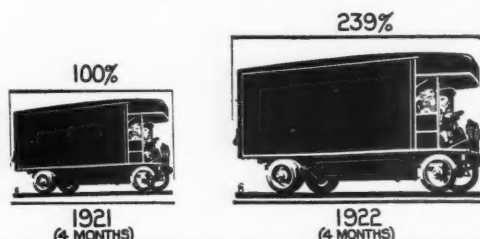
New York City utilizes more current for electric trucks alone, than cities like Binghamton, N. Y. and Cambridge, Mass., use for lighting, heating, power, and all purposes combined.

Tires on electric trucks cost less than the cost of shoeing horses for the same amount of work.

One electric garage in New York City, uses more current per year than 4000 residences.

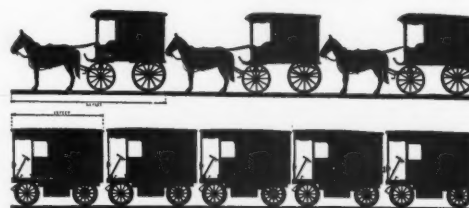
Eight electric garages in New York City consumed over 4,000,000 kilowatts of current last year. Registration figures on electric trucks as of November 1st, 1922, show that there were 10,457 electric trucks registered in the United States. Of this total, 4,237 are in New York territory, 1,640 in Chicago, 1017 in New England and 836 in Eastern Pennsylvania.

PERCENTAGE OF INCREASE IN ELECTRIC TRUCK SALES METROPOLITAN DISTRICT



A VITAL DIFFERENCE

Space Occupied by Horses and Wagons
Compared with Electric Trucks



The New York Edison Company
Automobile Bureau

NATIONAL ELECTRIC TRUCK SHOW

Electric Truck Specifications

Name and Model Number	Carrying Capacity	Chassis Weight—Exclusive of Battery	Chassis Weight—With Minimum Battery Capacity	Chassis Weight—With Maximum Battery Capacity	Chassis Price	Maximum Speed	Location of Battery	Mileage Per Charge	Motor	Controller	Speeds Forward	Drive	Rear Axle	Springs	Front Tires	Rear Tires	Steering Gear	Wheelbase	Per Cent of Weight on Rear Wheels
C-T D-1	1000	2200			1585	14	A	55	G-E	Own	4	Own	Flot	Shel	36x3	36x3 1/2	W	100	69
C-T B-1	1500	2300			1985	14	A	60	G-E	Own	4	Own	Flot	Shel	36x3	36x4	W	91 1/2	71
C-T D-1.5	1500	2300			1985	14	A	60	G-E	Own	4	Own	Flot	Shel	36x3	36x4	W	101	66
C-T B-2	2000	2400			2150	14	A	50	G-E	Own	4	Own	Flot	Shel	36x3 1/2	36x5	W	124	70
C-T B-4	2000	2400			2150	14	A	50	G-E	Own	4	Own	Flot	Shel	36x3 1/2	36x5	W	116	84
C-T C-6	4000	4000			2575	10	A	45	G-E	Own	4	Own	D	Shel	36x4	36x4 1/2	W	122	70
C-T C-7	6000	4300			2850	10	A	45	G-E	Own	4	Own	D	Shel	36x4	36x4 1/2	W	116	84
C-T A-7	7000	5000			3550	10	A	45	G-E	Own	4	Own	D	Shel	36x5	36x5 1/2	W	122	70
C-T A-10	7000	5800			3850	11	A	45	G-E	Own	4	Own	D	Shel	36x5	36x5 1/2	W	122	70
Kelland AT	10000	6500			3960	10	A	45	G-E	Own	4	Own	D	Shel	36x7	36x7 1/2	Ross	102	60
Kelland BT	10000	1950	3050	3550		15	S	50	G-E	G-E	4	R	Flot	Mer	34x3 1/2	34x3 1/2	Ross	102	60
Kelland CT	1500	2050	3150	3950		15	S	50	G-E	G-E	4	R	Flot	Mer	34x3 1/2	34x3 1/2	Ross	102	60
Kelland DT	2000	2150	3450	4050		15	S	50	G-E	G-E	4	R	Flot	Mer	34x3 1/2	34x3 1/2	Ross	106	60
Kelland AH	1000	2500	3600	4100		15	A	45	G-E	G-E	4	C	D	Mer	36x3 1/2	36x3 1/2	Ross	106	60
Kelland BH	1500	2600	3700	4500		15	A	45	G-E	G-E	4	C	D	Mer	36x3 1/2	36x3 1/2	Ross	106	60
Kelland CH	2000	2700	4000	4600		15	A	45	G-E	G-E	4	C	D	Mer	36x3 1/2	36x3 1/2	Ross	108	50
Lansden BG	1250	1400			1600	15	S	50	G-E	G-E	4	R	Flot	SP	36x3	36x3 1/2	Lav	108	60
Lansden MC	2000	2800			1850	12	A	50	G-E	G-E	4	C	D	SP	36x3	36x3 1/2	KH	120	60
Lansden MD	4000	4400			2250	11	A	45	G-E	G-E	4	C	D	SP	36x4	36x4 1/2	KH	133	60
Lansden ME	7000	5700			2950	10	A	45	G-E	G-E	4	C	D	SP	36x4	36x4 1/2	KH	146	60
Lansden MF	10000	7500			3350	9	A	40	G-E	G-E	4	C	D	SP	36x7	36x7 1/2	KH	156	60
Lansden MG	12000	8900				7	A	35	G-E	G-E	4	C	D	SP	36x7	36x7 1/2	Gem	128	62
Milburn Model 40	2000	1990			1985	15	H&S	35	G-E	Own	4	C	W	Math	32x4 1/2	32x4 1/2	Gem	115	96
Milburn Model 43	1000	1690			1585	18	H&S	50	G-E	Own	4	C	W	Math	33x4	33x4	Gem	105	48
Milburn Model 27D	500	1325			1085	14	H&S	50	G-E	Own	4	C	W	Math	36x3 1/2	36x4	Gem	103	
O. B. A.	2000				2175	14			G-E	Own		C	D		36x4	36x4	Own	107	
O. B. B.	4000				2650	13			G-E	Own		C	D		36x4	36x4	Own	135	
O. B. C.	7000				3750	11			G-E	Own		C	D		36x4	36x4	Own	143	
O. B. D.	10000				3850	10			G-E	Own		C	D		36x6	36x6	Own	143	
Steinmetz 10	1000	2000				16	H&S	52	Diehl	Own	4	R	Russ	Shel	32x4 1/2	32x4 1/2	Lav	106	60
Steinmetz 15	1500	2800				16	H&S	55	Diehl	Own	4	R	Russ	Shel	33x5	33x5	Lav	114	66
Walker 22	2000	2500				14		60	West	West	5	Own	Own	Math	34x3 1/2	34x3 1/2	Ross	101	66
Walker 28	4000	3700				13		60	West	West	5	Own	Own	Math	36x4	36x4	Ross	114	66
Walker M 2	1250	2300				15		60	West	West	5	Own	Own	Math	36x3 1/2	36x3 1/2	Ross	94	66
Walker N	10000	6300				10		50	West	West	5	Own	Own	Math	38x6	38x6	Ross	141	66
Walker F	7000	3400				11		50	West	West	5	Own	Own	Math	38x5	38x5	Ross	131	66
Walker EN	4000	3000			3100	13 1/2	A	50	G-E	G-E	5	Own	D		36x4	36x4	Gem	114	60
Walker EL	6000	5000			3700	13 1/2	A	50	G-E	G-E	5	Own	D		36x5	36x5	Gem	132	60
Walker ES	10000	7500			4500	12	A	50	G-E	G-E	5	Own	D		36x6	36x6	Ros	150	70
Walker ET	14000	7500			4800	11	A	50	G-E	G-E	5	Own	D		36x6	36x6	Ros	150	70
Ward WS 2	4650	1650				14	S	75	G-E	Own	4	W	Shel	Shel	32x3	32x3 1/2	Own	88	56
Ward WA 2	7200	2860				13	A	52 1/2	G-E	Own	4	W	Shel	Shel	32x3	34x4	Own	90	61
Ward WB 2	7200	2470				13	S	72 1/2	G-E	Own	4	W	Shel	Shel	32x3 1/2	34x4	Own	90	61
Ward WB 2	10000	3650				12 1/2	S	45	G-E	Own	4	W	Shel	Shel	34x4	36x5	Own	102	64
Ward WD 2	10000	3350				12 1/2	S	70	G-E	Own	4	W	Shel	Shel	34x4	36x5	Own	102	64
Ward WD 2	14000	4875				11	S	60	G-E	Own	4	W	Shel	Shel	36x5	36x7	Own	114	68
Ward WD 2	14000	4350				10	S	60	G-E	Own	4	W	Shel	Shel	36x5	36x7	Own	114	68
Ward WF 2	20000	7200				10	S	40	G-E	G-E	5	W	Shel	Shel	36x6	36x10	Own	132	70
Ward WF 2	20000	6450				9	S	40	G-E	G-E	5	W	Shel	Shel	36x6	36x10	Own	132	70
Ward WH 2	28000	9400				9	S	38	G-E	G-E	5	W	Shel	Shel	36x7	36x12	Own	146	71
Ward WH 2	28000	8200				9	S	38	G-E	G-E	5	W	Shel	Shel	36x7	36x12	Own	146	71
Ward WM 2	8100	2600				12 1/2	S	65	G-E	Own	4	W	Shel	Shel	32x3 1/2	32x4	Own	188	70
Ward WM 2	9100	2950				12	S	60	G-E	Own	4	W	Shel	Shel	32x3 1/2	32x5	Own	96	70

NOTE: Battery Equipment in all above makes is at the option of the purchaser. Battery Location Abbreviations: A—amidships; H—under hood; and S—under seat.

NATIONAL ELECTRIC TRUCK SHOW

The National Electric Light Association

THE National Electric Light Association is a voluntary organization of corporations, firms and individuals interested in the development of the electric light and power industry. Its object is to advance the art and science of the production, distribution and use of electrical energy for light, heat and power for public service. In the furtherance of this object its activities are largely educational.

THE MEMBERSHIP

Its membership is divided into nine classes:

Class A, electric light and power company members.

Class B, employes of electric light and power companies.

Class C, officials of public service commissions, instructors, teachers or practitioners of engineering and related science, or of other professions interested in the art of applied electricity.

Class D, companies or firms engaged in the manufacture of electrical apparatus or equipment for the production or use of electrical energy.

Class E, officers or employes of Class D members.

Class F, companies or firms of electrical jobbers, contractors, dealers, electrical or mechanical engineers, publishers, associations or others who are interested in advancing the use of electrical energy.

Class G, officers or employes of Class F members.

Foreign members and honorary members.

The officers of the National Electric Light Association are a president, four vice-presidents, a treasurer, an executive manager, and a national executive committee consisting of the officers, retiring president, chairmen of four national sections—accounting, commercial, public relations and technical, a representative from each of the thirteen geographic divisions, nine members at large, six elected from the Class A and Class D membership and three from the Class B and Class E membership. The scope of activities of the association is so broad as to have points of great interest and concern to each class of membership.

HEADQUARTERS

A trained staff is maintained at N. E. L. A. Headquarters in the Engineering Societies Building, 29 W. 39th Street, New York City.

Headquarters activities are in charge of an executive manager, who directs all activities of the association, under the authority and supervision of the officers and executive committee.

Departments have been created to handle specific subjects and each is in charge of a trained man.

Committee activities are co-ordinated through the office of the committee secretary, whose duty it is to assist chairmen of sections and of committees in properly scheduling meetings so that there will be as little overlapping of dates as possible, to prepare notices of meetings and handle other secretarial work.

Technical work, and particularly field work on inductive co-ordination and similar subjects, is handled under the direction of technical section committees through the engineering staff.

Publicity and advertising is handled by the publicity department under the direction of the Public Relations National Section.

Service and accounting matters are handled directly by the service department, under the direction of the proper committees. The offices of the joint committee for business development are located at headquarters.

The N. E. L. A. Bulletin, rate research and rate book editorial departments are maintained at headquarters, and all the work of editing and printing advance papers and reports for conventions, and subsequently preparing and publishing the proceedings of the convention, is carried on by the headquarters' staff.



FRANK W. SMITH, Pres.
of the N. E. L. A.

The N. E. L. A. Convention

The annual convention of the N. E. L. A., will be held in New York, June 3d to 8th, with headquarters at the Hotel Commodore. Besides the National activities, of this association, the reports of 13 geographical divisions and the reports of 200 committees of this association will be heard. It is anticipated that there will be at least 7500 and probably 10,000 delegates and guests in attendance. There will be 21 business sessions, four morning general and executive sessions, four afternoon sessions—Monday, Tuesday, Wednesday and Thursday—for the accounting, commercial and technical sections, three afternoon sessions—Monday, Tuesday and Wednesday—for the public relations section, one afternoon session—Thursday—devoted to the customer ownership committee's work, and one evening session—the public policy session—Thursday evening in Carnegie Hall. In addition, there will be an elaborate recreation and entertainment program, opening with the president's reception, followed by a ball Monday evening in the three main ballrooms of the Commodore.



Two Modes of Transit Provided by Pennsylvania-Ohio Electric Company. The DeLuxe Coach Was Added for Convenience

Pennsylvania-Ohio Electric Company Adopts the Bus as an Auxiliary Service

Although Bus Service Was Originally Inaugurated in Response to Public Demand, Superior and Modern Service Developed New Business for Both Lines by Increasing the Riding Habit

By M. J. KOITZSCH

VISION and ability to grasp the trend of public demand originally prompted the Pennsylvania-Ohio Electric Co. to its radical departure of adding motor bus transport to its service. This company had suffered loss of business when buses operated by private owners in direct competition with its interurban electric lines were first inaugurated. Today, however, the company is enjoying not only a growing revenue from its own bus lines but is finding a satisfactory increase in its electric line service as well.

The Pennsylvania-Ohio Electric Co. has for 15 years been operating a 15-mile suburban line between Youngstown and Warren, following the main highway through intermediate points, Girard and Niles. This route covers a section that is engaged largely in the manufacture of steel and is sufficiently populated to make passenger transportation profitable. The total population approximates 250,000. The total track length covered is 15 miles, of which 11.4 miles is on city streets,

the distances on the city streets being as follows: Youngstown, 3 miles; Girard, 1.7 miles; Niles, 3.7 miles, and Warren, 3 miles. None of the entire length of the electric railway is over private right of way. That section of the track not on city streets borders the public highway. And except for a 3-mile stretch through Youngstown the whole line is single track. Although a large portion of the electric railway's route is through city routes, describing large circuitous loops, requiring 70 minutes to make a complete journey, shorter suburban service is provided between Youngstown and Girard, giving a ten-minute service.

Faster Service Demanded

It appeared that the service provided between the various terminals was not fast enough, for there always had been a persistent demand for quicker connections, especially between Youngstown and Warren. Much of the business that ordinarily would have been assumed by the local electric company was for this rea-

son directed to the Erie steam railway which operated frequent through-trains through these points in traveling from Pittsburgh to Cleveland. But the competition of this line was not considered dangerous, for the traveling done between these communities was sufficient to maintain the local railway despite the business lost because of the Erie road.

The difficulty, however, arose in March, 1921, when a number of private owners inaugurated a service which diverted considerable traffic from the electric lines. Despite the fare ranging from 25 to 40 cents charged by these buses, against that of 30 cents and 10 cents for intermediate towns, competition continued to increase. Furthermore, the electrics had a system of zone tickets, which were purchasable for \$1, that actually reduced the commuter's fare to approximately 22 cents.

The backbone of the independent operators' success was braced by only one redeeming feature—the buses managed to make a complete journey in 50 minutes.

more than the year before and on the other \$1150 more. The Youngstown-Warren line could, therefore, reasonably have expected from \$1000 to \$3000 in December. Evidently, it can be assumed, the coach business created a new traffic, representing in excess of \$10,000 or 33 per cent increase over existing traffic. A limited street car service would hardly have produced such an increase.

Many of the patrons of the new service are women, who, in many cases, are of families owning automobiles. Many are officials of industrial concerns who prefer the coach service to using their own cars on a crowded highway and being compelled to find parking space. That the coach service has developed interchange of traffic between the cities is indicated by the fact that the large stores in these communities in their advertising, stress the fact that the coaches stop at or near their stores. Furthermore, there is no prejudice or ill will against the company for furnishing this transportation; in fact, its permanence and responsibility attract patronage.

Since this new service was put into effect a new line was established between Sharon and Youngstown, on which route



Illustrates the Type of Service Being Offered by the P-O Company

two coaches are employed and one kept in reserve. The route is 15 miles long.

Service and garage facilities were arranged so that service can be obtained at either Sharon or Warren. This arrangement was decided upon not only because the machines can be taken care of at either of these terminals but chiefly because the following day's operation would commence at a point leading to the point of greatest activity—toward the bigger city.

The story of this electric company's early difficulties in solving the bus problem is very interesting and may contain an idea for the wide-awake dealer, alert to the possibilities in his territory where an electric company may be similarly situated. Interurban service has a distinct field and a very satisfactory phase of this field is that it does not encroach on the patronage of established lines, provided both services are operated along strict business lines.

Motor Truck Industries, Inc., Announces National Transportation Exhibition

ACCORDING to a statement just issued by Don F. Whittaker, manager of Motor Truck Industries, Inc., of Detroit, this organization will stage a National Transportation Exhibition at the Coliseum and Coliseum Annex, in Chicago, September 1st to 7th.

Manufacturers of commercial cars, gasoline railway cars, motor buses, taxicabs, motor propelled fire apparatus, loading devices, and so forth have been invited to exhibit. Manufacturers of "specialized" parts for commercial cars will participate. The show will be conducted on a non-profit basis, its main object being to stimulate the motor truck business from a transportation angle.

Mr. Whittaker states further, "that the exhibition is to be a strictly business show, and the endeavor of the management will be to place before the public a commercial transportation exhibit that will attract truck owners, fleet owners, dealers and service managers. The very latest developments in all lines will be shown, that those who attend may know exactly what progress has been made in motor transportation. A large vacant lot has been secured near the Coliseum on which the mechanical features of loading and unloading devices, hoists, and such apparatus which increases the efficiency and economy of the commercial car may be attractively demonstrated. An educational campaign will be conducted during the week, one of the features of which will be a school conducted for motor truck service managers and mechanics. The use

of better tools and service shop equipment will be demonstrated in actual practice. Instruction in the servicing of specialized units, including engines, clutches, rear axles, etc., will be given by experts. Instruction in flat-rate methods of truck repair, will also be given.

"For the salesmen and dealers of the industry there will be a sales school, with sales talks by the best speakers obtainable. This school will be practical in its work, there will be no theory. It will give dealers and their salesmen real sales ammunition that they can take home with them and put right into their business. It is anticipated that many manufacturers will hold dealer meetings during the week. The time of the show is well chosen, as it makes it possible for dealers and others to make the show visit a part of their vacation plans. Chicago's weather at this season of the year is at its best."

Prize Contest

"The directors of Motor Truck Industries, Inc., will be judges of a \$250 prize contest open to all on the best exposition on specialization in motor vehicle building. The thought may be conveyed in an essay, in copy for a booklet to be issued by the organization, or advertising copy. The contestant may choose his own method. The winner will be awarded \$125, second prize is \$75 and third is \$50."

The Show Committee

"All arrangements for the show will be in the hands of a show committee from the

association, consisting of M. L. Pulcher, vice-president and general manager, Federal Motor Truck Co.; Fred Glover, president, Timken-Detroit Axle Company; H. T. Boulden, vice-president Selden Motor Truck Co.; L. M. Viles, president, Buda Motor Co.; George M. Yeoman, vice-president, Continental Motor Co., and T. R. Lippard, president, Stewart Motors Corp. Don F. Whittaker, will manage the show.

"Motor Truck Industries, Inc., now has over fifty members among the motor truck and parts manufacturers. M. L. Pulcher, of the Federal Motor Truck Co., is president of the organization, and the directorate consists of nine motor truck manufacturers and six parts manufacturers."

Kleiber Branch to be Moved

The Atlanta, Ga., branch of the Kleiber Motor Truck Co., is to be closed and the entire equipment moved to the parent factory at San Francisco. This branch was opened two years ago and has been operating steadily ever since.

The advertising of the Motor Products Corporation, Detroit manufacturer of automotive parts and equipments, is now being handled by Brooke, Smith and French, Inc., national advertising and merchandising organization of the same city.

SALES and SERVICE



These Two Departments Constituted the Basis Around Which the New Home of the Roberts Motor Car Co. Was Built. All Factors Making for Their Betterment Were Given Priority

ALL factors entering into the most efficient manner of handling the sales and servicing of motor trucks were thoroughly analyzed before the new home of the Roberts Motor Car Co., Inc., Portland, Ore., distributors of Federal trucks was reared. This new structure, which was recently completed, was also designed with a view of accommodating the needs of anyone owning or operating a truck. The Roberts Company is capably equipped to provide repair work on all makes of trucks, except Fords, and parts are supplied to anyone for any make of truck.

The building is of ample size, being 100 x 200 ft. in size, and is of one story

would be well worth the space it would require as it may contain an idea or a suggestion of value to other distributors or dealers contemplating expansion or a change of quarters.

Sales Floor in Two Sections

The sales floor really consists of two sections. A main section in front, 60 x 100 ft., and an L-shaped section at the rear providing a floor space of 40 x 50 ft. As mentioned hereinbefore perfect lighting is afforded through windows and skylights. The rear "L" is practically as well illuminated as the main floor. The construction of the windows permits of sufficient ventilation for clearing the atmos-

phere of any fumes which might result from truck operation on the floor. No posts obstruct the convenient movement of trucks nor obscure the view.

To the left of the entrance an effective display of the principal parts of the engine transmission and rear-axle attracts the attention of all visitors. Along the left wall is a complete display of all models of Federal trucks, and on the opposite side is a display of different types of truck bodies. The offices of the salesmen are located along the front and right side of the entrance. They are enclosed in glass permitting vision to the main floor. Used trucks are on display in the L section together with truck bodies taken from used trucks.

The general office comprises a space 22 x 50 ft., facing the main aisle of the building, and is provided with a window for the transaction of business. Entrance is provided from the rear, at which point a rest room and a built-in fire-proof vault are located. Business pertaining to parts and stock is handled through the window to the stock-room which immediately adjoins the general office. The office equipment is modern and of steel throughout consisting of two large typewriter desks, two bookkeeping desks, steel filing cabinets and a safe, in addition to a Burroughs bookkeeping machine. Altogether, the office is large and spacious, affording plenty of room for additional desks as time requires without congesting office routine. The private offices adjoin the main office. There are three of these,



How All Parts Are Systematically and Compactly Arranged

Note the two counters partly shown to the right and left. Parts are delivered to customers and mechanics over them, thus avoiding contact

concrete construction. The arrangement from left to right is sales floor, offices, stock room and service shop. All departments are made readily accessible by a six foot pavement extending down the full front length of the building. Ideal natural illumination is provided the entire interior through some 400 ft. of windows and 23 sky-lights. In mounting the huge sign, shown in one of the accompanying illustrations, the concern managed to gain the full advertising value of its location. The sign is so set that it is conspicuously in evidence to anyone crossing the steel bridge, which is almost in line with the building, and carries heavy traffic.

The general lay-out of the new building is such that a general review of it



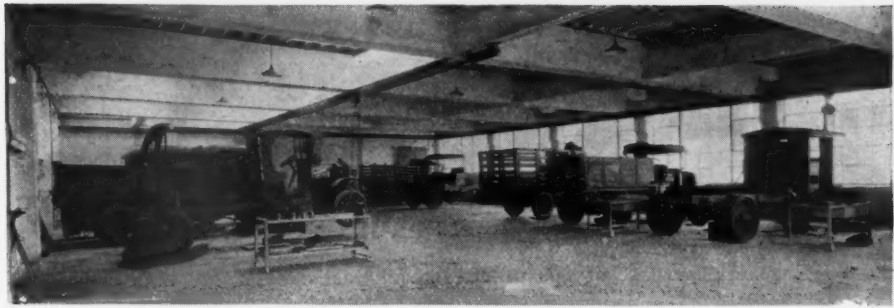
A Complete Line of Federal Models Are Always on Display

one which is connected directly with the general office.

The parts or stock-room is situated between the main office and the service shop.

The steel bins and racks, which are used for all parts, make for quick service. This department measures 38 x 65 ft. All replacement parts are systematically and compactly arranged as may be noted from the accompanying illustration. All parts are sold over a counter shown to the left of this illustration. Parts drawn for the service room and shop are delivered over another counter shown in the same illustration at the right and half way back. This arrangement has been found to be a very satisfactory one as it separates the mechanic from the parts buyers thereby greatly reducing the possibility of losses through collusion.

The service shop floor occupies a space



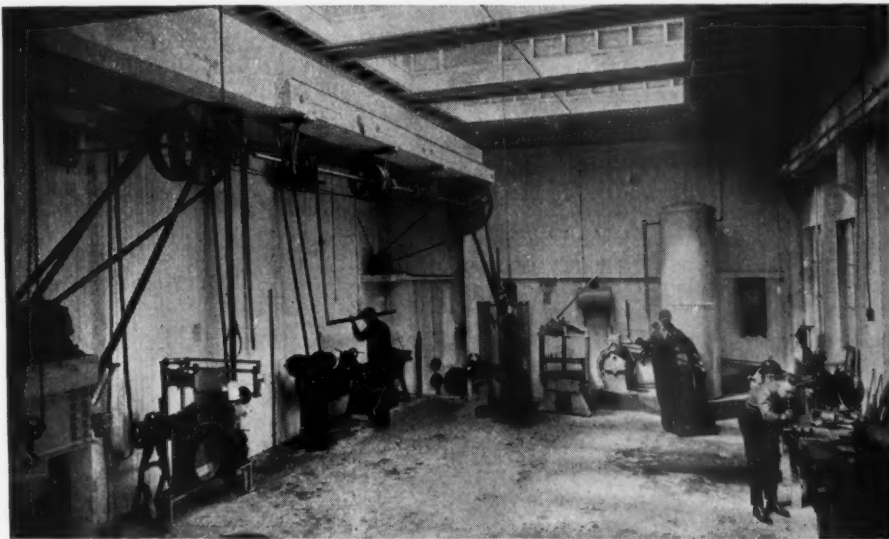
The Service Shop Amply Accommodates Two Rows of Trucks Without Interfering With Driving Freedom

of 60 x 100 ft., with no posts in it. This allows for a row of trucks on each side of the room and leaves approximately twenty feet open driving space in the center of the room so that trucks coming in or going out are not blocked. Over-

head tracks extend the full length of the building permitting all rear-end and front-end work to be conveniently done. Both tracks terminate directly over the wash rack located in one corner where all units are washed before being worked upon.

The wash rack is enclosed by 5 ft. concrete walls, which prevents water and dirt from being splashed or traced onto the main floor. Boiling water forced through spray nozzles with 150 lbs. of air pressure is employed in washing.

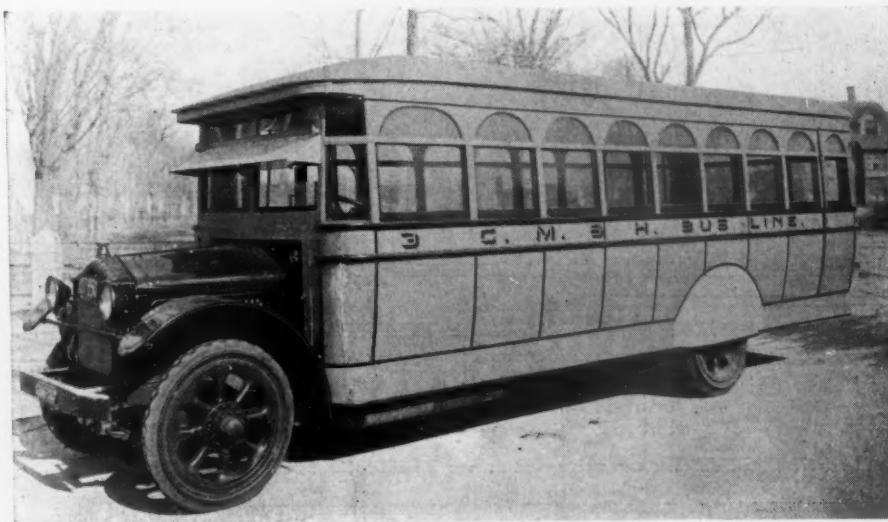
No stationary benches are installed on the service floor. Instead, each man has his own bench of steel construction, which has a tool drawer and vise installed. A floor plan and creeper are furnished with each bench. These benches have wheels on one end, allowing them to be moved to the job instead of carrying the job to the bench. This arrangement tends to save considerable time and eliminates the accumulation of refuse and junk parts usually found upon and under the stationary type of bench. Some twenty air leads extending down the walls makes air connections available in any part of the service floor. Air drills and hammers are used exclusively.



Neat Lay-Out of the Equipment Employed in Service Work

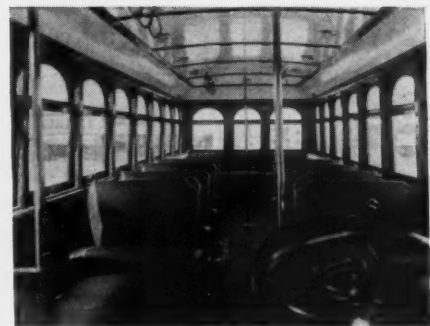
Motor Buses Double Congregation

Motor buses and touring cars bring 100 persons each Sunday to services at the Madison Township Baptist Church in Lake County, Ohio.



Showing a Specially Designed, Large Capacity Essex Bus, Equipped With All the Modern Appointments of Comfort Mounted on a Garford Chassis

Briefly, the floors are hardwood, splined and rest directly on the chassis. The ceiling is of three-ply veneer finished in either white enamel or mahogany. Sections for advertising cards are provided. Electrical equipment consists of dome lights, red and green pilot lights and push buttons. Entrance is at the right through a folding door operated by the driver. Emergency door at rear. The sides are sheeted and covered with 18-gage steel up to the belt line and panelled off with half-oval iron. Exhaust heating is also provided. This body was designed and built by the Essex Truck Body Corp., 29 Centre Street, Lynn, Mass.



Trolley Buses and Flexible Vehicles for Street Railway Service

By WILLIAM P. KENNEDY, M. S. A. E., President Kennedy Engineering Corp., New York

THE general purpose of this paper is to make evident the necessity for closer co-operation between the engineers of the automotive industry and the operating organizations in the street railway field for the purpose of more effectively solving the particular problems of the latter in their endeavor to develop flexible transportation equipment to co-ordinate with the operation of their rail transportation facilities. Further, to promote the utilization wherever feasible of railway power supply in the employment of flexible bus type equipment in supplementing and extending existing railway organization service.

Vital Influences Tending Toward Flexible Equipment

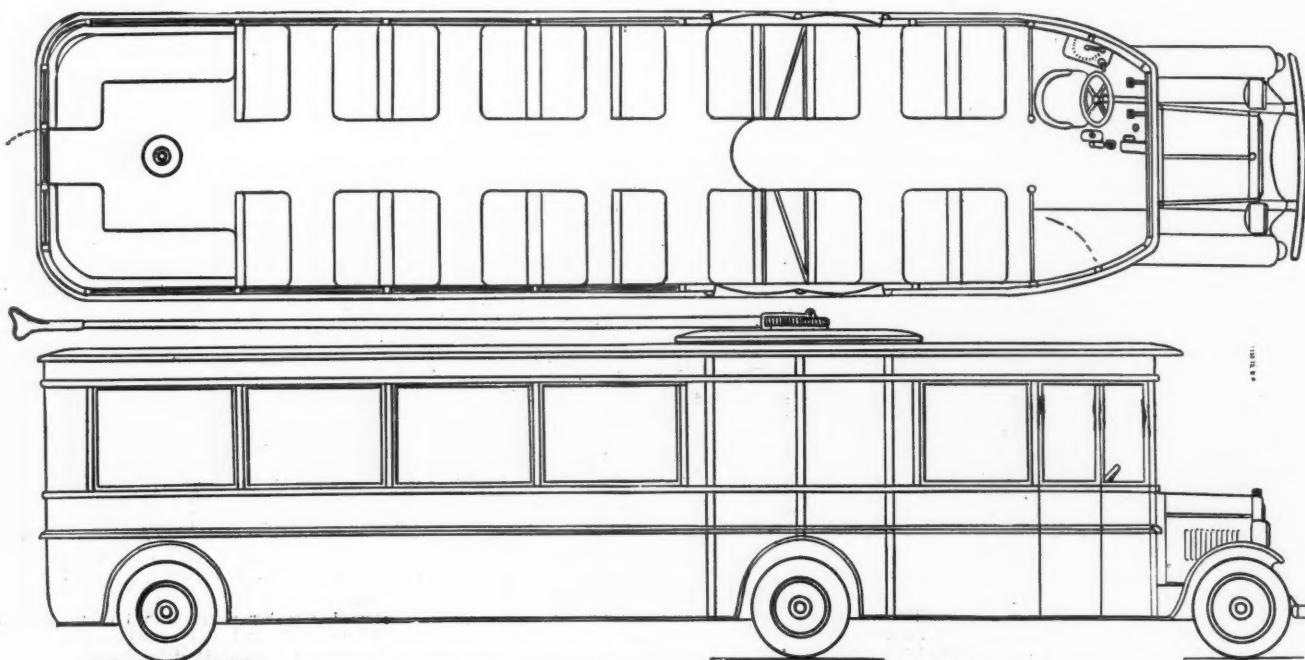
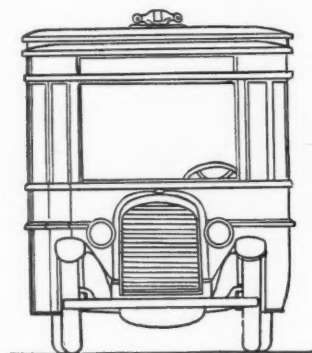
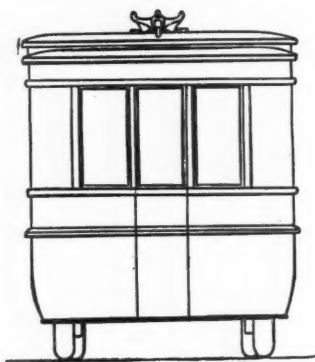
The street railway industry has grown up under the fallacious belief that it was

equally as stable as the railroad industry, and the development of its equipment seems to have progressed with the absence of any thought of possible competition. Unfortunately, its permanency is much more dependent upon a number of isolated and local conditions, being subject to political and community requirements, and monopolizing to a large extent the public thoroughfares which are in demand for use by others with different purposes. It was not recognized until a few years ago that a number of influences were growing up which would not only generate competition but seriously threaten their existence in many localities. Of these influences two are particularly conspicuous: One the development of public vehicles in the form of the automobile capable of rendering competing service in the hands of independent operators, and the other the **influence on public opinion of the private use of the automobile in creating a demand for a different kind of public service.**

If the street railway utilities had been developed in a competitive atmosphere similar to the conditions under which lighting and power distribution have been developed they would have been in a more elastic position to adjust themselves to any condition of change, but having an inborn assurance of permanency the intrusion of competition into their immediate field has found them in an attitude of resistance instead of flexibility

to offset this with the use of equipment designed and applied to overcome opposition.

There is little question as to street railway organization permanency along existing lines in rendering mass transportation service in thickly populated districts, but changes in equipment and mode of service will be demanded urgently in other localities. It is equally reasonable to assume that these organizations will shortly prepare to provide for these essential changes in the direction of employing automotive type equipment, and it is in these activities that there is a necessity for closer co-operation between the engineers of the automotive industry and those of the railway industry.



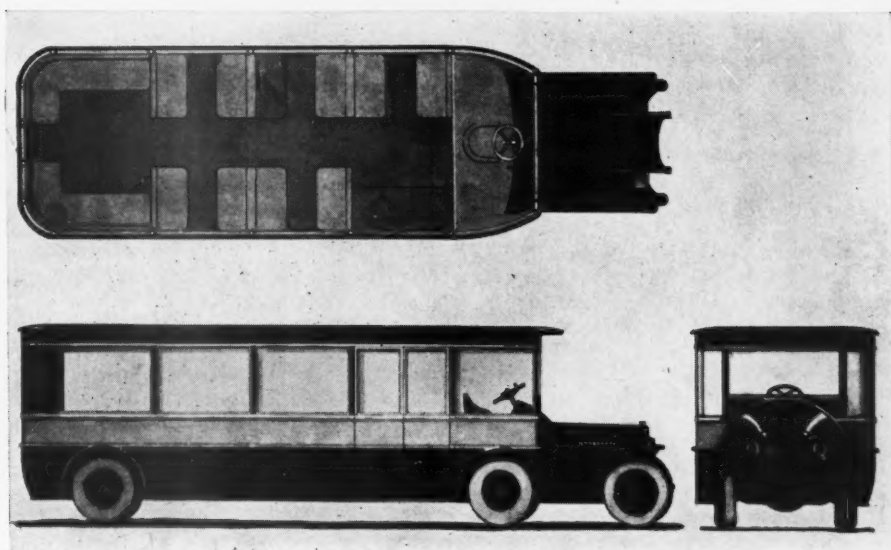
Views of the Tractor Trolley Coach, Which Comfortably Seats 50 Passengers

Difference of Engineering Practice in Street Railways and Automotive Industry

An illuminating picture of the growth in increasing weight of street car equipment up to vehicles weighing 80,000 lbs. and the recent replacement of these by vehicles weighing 28,000 lbs. for rendering equivalent service with very much reduced operating cost appears in an article in the General Electric Review of June, 1922.

This briefly shows that street railway engineering followed a line in which the weight of equipment and the cost of operation were not so economically important as they have recently become, and that in the past railway engineers were not forced to use the stronger and lighter materials necessitated by competition in design and manufacture which has been the soul of the automotive industry, tending to produce vehicles of minimum weight for maximum performance. The automobile is a power vehicle exemplifying characteristics in marked contrast with the street car, developed, of course, for an entirely different service when the number of passengers and speed of the machine are taken into consideration. Nevertheless, the fact is apparent that the changing demand in public passenger transportation encourages closer co-operation between the two schools of engineering thought existing in these different fields to combine in developing the best which can be procured to meet these new requirements.

The railway engineer has been handicapped from a progressive standpoint by the absence of the necessity of meeting competition. There has been a comparatively limited output in machines for his industry, reducing the possibility of mass production, and, consequently, of necessity there have been limited sources from which he could procure competitively developed equipment. His power units came from two or three large manufacturing organizations providing other varied products, which naturally limited any tendency to progress rapidly towards lighter and more flexible machines. Likewise his sources of body structures were limited and confined to comparatively few manufacturers with the obvious handicaps that changes from previously established standards were difficult to obtain. Furthermore, the necessity for caution in providing against accident and damage in rendering public service enforced upon him a conservatism from which the automotive engineer has been almost entirely free; obviously, it must be recognized that a readiness to quickly rise up and provide radically different forms of vehicles to meet emergencies in offsetting unforeseen competition was not to be expected. Now, however, after a lapsed period in which competing types of vehicles in the form of motor buses have been permitted to intrude upon his business field, with the consequent loss of the most easily secured and profitable part of his sources of revenue, his attitude must necessarily change, and he must at once proceed to provide an acceptable solution in a new form of equip-



Front, Side and Plan Views of the Tractor Motor Coach

ment to enable his industry not only to recover its lost business but to reach into new fields for expansion and profit.

Co-operation Between Railway and Automotive Engineers

He cannot be expected to be entirely familiar with all of the new equipment available to him of which he might make use, nor has he had experience in the use of such new equipment as will enable him to safely provide for the contingencies which are inherent to public service passenger transportation. On the other hand, while the automotive engineer may be entirely familiar with the variety of forms and possible uses of the mechanical and power units which have been developed within his field he has not acquired by experience any complete knowledge of the service demands to which such mechanical and power units may be subjected under the arduous services required in rendering the continuous performance demanded in public utility service. Hence there is good reason for give and take in the meeting of these different minds when concentrated in common upon the new problems in question, and it must be conceded that such an intimate collaboration would certainly be productive of advantage to the industries represented by both parties.

The particular fundamental fact to be borne in mind is that the vehicles which would best serve these purposes would be those that could utilize partly, if not entirely, the power supply and distribution system available for such employment existing within the street railway organizations. By such means existing properties representing large investment can be preserved and applied to a much greater range of service activity than was ever contemplated by the founders of these public transportation organizations.

A general specification of the desired requirements of street railway organizations in providing transportation service through flexible vehicle equipment will be found in the report on this subject of a committee of the New England Street Railway Club dated February 2, 1922.

Trolley Bus One Solution

Obviously, the first step in this general direction would be a broader application of the trolley bus as constituting a means of solution of some of the existing railway organization problems. It cannot be expected to meet all these problems, but it must be admitted that the desirability of its use in many cases is clearly indicated.

The use of trolley buses in European countries has been covered in a very comprehensive way by H. L. Andrews, Railway and Traction Engineering Department, General Electric Co., who, in an article in the Street Railway Journal, December 4th, 1920, points out that:

European countries have for a great many years successfully operated trackless trolleys. In 1920 there were in England twenty companies with more than 100 miles of trackless trolley installations operating or authorized, while Italy had eight companies comprising a total of 43.5 miles of route, and Germany had eight installations for passenger and freight traffic. France, Sweden and Austria have a number of installations in successful operation.

For the most part European trackless trolleys weigh approximately 6,048 lbs. less load and have a seating capacity of 25. In some few installations larger cars weighing over 11,000 lbs. complete are used. One installation is equipped to handle motor car and trailer cars, the motor cars having a seating capacity of 22 and the trailer cars of 20.

English practice differs somewhat from any of the Continental systems. Two motors are used, each being mounted on the truck chassis and connected to a jack shaft through worm gearing. The jack shaft carries a sprocket wheel and power is transmitted to the driving wheels by means of chain drive.

The Paris transportation system is now operating trolley buses in extension of trolley lines in rapidly growing suburban sections.

In the United States and Canada recent installation have been made at Staten Island, New York City, Baltimore, Md.; Richmond, Va.; Minneapolis, Minn.; Los Angeles, Cal.; Toronto, and Windsor, Ontario.

"The prospective fields of the rail car, trolley bus and gasoline bus in city transportation" has been treated in great detail by J. C. Thirwall, Railway and Traction Engineering Division, General Electric Co., and published in the *General Electric Review*, December, 1921.

"The Place of the Motor Bus in Passenger Transportation," by Walter Jackson, as published in the *Electric Railway Journal*, February 28th, April 3rd, April 24th, May 29th, July 3rd and July 31st, 1920, are well worthy of the attention of automotive engineers.

In the trolley bus form of machine the vehicle is immediately released from the handicap of running on tracks, and while it is, so to speak, tied to the trolley wire, the flexibility of movement has many real advantages. It is free to pass roadway obstacles and can pick up and discharge its passengers at the sidewalk. Incidentally, its operation may relieve the railway organization from street paving obligations and there should be a decided further economic advantage in a lower cost of mechanical upkeep due to the vehicle operating on rubber tires. Its employment requires practically no changes in organization for operation and maintenance, and with the use of central station energy it should be able to compete with buses operated by gasoline costing a much higher and varying price for the power required in transportation as well as a lower upkeep cost by the use of electrical equipment for frequent speed changes as compared with mechanical transmissions. Another important consideration in this direction is the possibility that within a short time taxation of the use of gasoline on a gallonage basis which exists at present in a number of States may become a general practice throughout the country, which would prove a serious handicap to a public service organization continuously operating quantities of machines.

Combination Dual Power Bus Equipment

The next logical step in the development of more flexible vehicle equipment would be the inclusion in the trolley bus of a secondary source of power for supplemental operation. This may be either a gas engine equipment or an electrical auxiliary in the form of a storage battery chargeable either from the line or at the power station. The obvious advantage of either of these is that supplemental vehicle service could be rendered beyond the limitations of the trolley and in this way there would be marked increased earning capacity in a machine so equipped. From an investment standpoint in going into new territories, such a dual power equipment would require only a partial installation of overhead line construction, permitting the vehicle to be operated beyond these extensions in various directions until the earnings from such extended service would warrant additional investment in further line

installation. Another place for the use of such a vehicle would be in those instances where short non-paying trolley lines have already been abandoned, and which have adjacent to them either laterally or beyond their zones paying territories. In other words, the resuscitation of such lines by this means would provide for return parallel routes in more paying localities or an extension of the service beyond the point where the existing lines end. Therefore, whether the auxiliary source of power should consist of gasoline or electrical equipment would depend upon the extent of off-line service to be rendered, particularly considered over long-time periods or years of operation. For instance, if the line operation was over 75 per cent of the bus route and the auxiliary service over 25 per cent of the route gasoline equipment would be indicated. If the off-line service represented 50 per cent of the performance it would become desirable to use central station power and for this purpose an electrical equipment would be indicated. It is well to accentuate here that such electrical equipment in the form of storage batteries, if charged intermittently from the line would not require to be very large, as the intermittent off-line service is not likely to be, at any time, more than a mile or two of operation, so that a comparatively small battery would serve this purpose. The employment of such a battery equipment with a means for intermittent line charging would have to be weighed up from an economic standpoint with the contrasting factors of the use of cheap central station power against the use of gasoline.

In applying such trolley buses or dual power buses to existing lines where trackage and a single overhead trolley is or has been in use, avoidance of installing the second overhead wire might be effected by the use of rail contacting devices incorporated in the vehicle. The advantages and disadvantages of such compromise equipment would have to be weighed up in each case, but trolley bus operation with rail contacting device is well within the range of feasibility.

Independent Buses With Electric Transmission Equipment

Aside from the trolley bus type of vehicle utilizing central station power it may be well from the standpoint of lower transportation cost to consider the employment of vehicles for ordinary bus service having gasoline electric transmission systems in contrast with the straight gasoline bus with mechanical transmissions.

The Tilling-Stevens petrol electric system as developed in Great Britain has been in use there since 1908 and at the present time there is at least a dozen transportation companies employing fleets of from 20 to 300 motor buses of this type, and very many more vehicles using this system are employed as motor trucks. This system is particularly simple, consisting of a gasoline engine having directly connected to it an electric generator. A separate electric motor is used to drive the propeller shaft. The con-

trol consists of a forward, neutral and reverse controller, and the speed is regulated by the engine throttle in combination with a lever varying the field resistances of the generator and motor.

In passenger transportation service the smooth operation, even acceleration and silence contribute to its popularity and at the same time its economy of operation is enhanced by these very same factors. For example, when the vehicle has been accelerated to its normal speed the power required to maintain this speed is a small percentage of that required for acceleration. Therefore, the engine may be slowed down almost to idling speed, but the motor speed and consequently the car speed is maintained by reason of the change in regulation of motor and generator fields. Well-substantiated claims are made that both fuel consumption and maintenance costs are very low in these vehicles.

In the United States gasoline electric transmission systems have been used in various forms from time to time for many fields and for military equipment requirements. In motor bus service the Fifth Avenue Coach Co. used a group of ten buses from 1908 to 1914 in regular schedule operation, and some of them remained in emergency service until 1917. These were designed by H. S. Baldwin, automotive engineer, and built under his supervision by the General Electric Co. The electric transmission system employed in these vehicles was entirely satisfactory from an operation standpoint, although they were somewhat handicapped by being used with gas engines which were not entirely suitable. This type of transmission equipment would have been continued except for the fact that it was not in regular production, and, therefore, could not compete with mechanical transmission equipment more readily available on the market.

Bus service is distinctly different from any other of the several forms of motor vehicle operations with which we are familiar, inasmuch as the machine is repeatedly operating over a fixed route where the road surface conditions are constant except for varying weather conditions and periodic seasonal changes. The other operating conditions, such as mileage, speed and stops per mile as well as average load carried are almost equally fixed and constant, so that with all these operating factors known in advance, it is comparatively easy to determine the relative advantages of one particular equipment as against another.

In bus operation the cost of constantly recurring speed changes is an important factor not only with reference to upkeep of the transmission but also the dynamic influence of these stops and starts upon the wear and tear of the other parts of the vehicle such as tires, brakes, etc., with particular emphasis on fuel consumption and it is in reference to these considerations that the use of electric transmissions may be of very much more importance in this field of service than they have hitherto been in use of motor vehicle equipment.

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Know Where You're at by Checking Up on Yourself

A COLORED youth went into a middle western drug store recently and asked the drug clerk as a special favor to call up a Mrs. Jones for him and ask her some questions. "Ask Missus Jones if she wants a boy to drive her cahr," the colored youth directed.

The drug clerk obligingly did this. "She says she doesn't want a boy—she has one to drive her car," the drug clerk told the colored youth. "Ask her if she ain't thinkin' of making a change."

"She says she isn't goin' to make a change; she's perfectly satisfied."

The colored youth's face became wreathed with smiles at this. The drug clerk looked at him in surprise.

"What are you grinning about?" the clerk queried. "You can't get a job with Mrs. Jones—she's got a boy."

"I ain't a-lookin' for a job. Ise got a job—wif Mrs. Jones! Ise just checkin' up on mahself, that's all."

The Same Check-up

The wise commercial car salesman will also check up on himself from time to time for the purpose of knowing where he's at, seeing just what he's doing and ascertaining just where he's going. It isn't necessary to wait for a new year to do such checking up. Any time at all is a good time to do such checking and right now is the best time of all.

To check up on oneself is to get a new slant on activities, a new vision, a new inspiration. It helps a man go out and do more business to realize just how he stands.

Commercial car salesmen might rate themselves according to the following table which has been prepared after a careful investigation into the factors which contribute to the making of 100 per cent efficiency in a salesman. In going through this table the salesman can readily ascertain his status by placing opposite each paragraph the figure which represents his efficiency along the lines mentioned in that particular paragraph. These percentages, of course, should not exceed the arbitrary percentages given in front of each paragraph.

The more honest and candid the salesman is in rating himself according to this table the more of a help to him in making more sales this checking up procedure will be.

Here, then, is the table:

Sales 50 Per Cent

Are you selling as many commercial cars as you were a year ago? Are you selling as many trucks as the other salesmen employed by the concern which em-

ploy you? If you are not making as many sales as these other salesmen why not? Are your sales increasing in proper proportion with the betterment in business conditions in your community?

Prospects 25 Per Cent

Do you keep track of prospects or trust to your memory? Have you any well thought out, tested plans of getting prospects? Do you follow up pros-



"Ask Her if She Aint Thinking of Making a Change?"

pects with the speed and thoroughness with which you should? Do you get after all prospects with business building consistency or do you rather shy away from the hard prospects? Are you getting as many prospects as you should and are you getting as much out of your prospects as you should?

Study 50 Per Cent

Do you keep alive to what is going on in the commercial car industry by reading the trade papers? Are you constantly meeting other salesmen in other lines and learning from them how to be more successful in making sales? Are you constantly studying and learning about your business and about people so that you are constantly growing in ability? Do you really feel that you know more now than you did a year ago or do you feel that you have slumped somewhat during the year?

Acquaintance 5 Per Cent

Just about the biggest asset the commercial car salesman can have is a very large number of friends and acquaintances in the locality where he is selling. It is possible for any man to increase his circle of friends and acquaintances if he will only try to do so. Has YOUR circle of friends increased

during the past year? Are you making definite efforts to make more friends? If you haven't increased the number of friends what is the trouble?

Buyer Contact 5 Per Cent

Do you keep in touch with the people who have purchased trucks from you? Do you call on them every now and then for the purpose of showing that you are interested in them and for the purpose of finding out if they can give you the names of some prospects? Do you get all the business you can get through this thing of keeping in close touch all the time with the people who have already bought trucks of you and who can be expected to buy trucks from you again and who can give you the names of other people who may be induced to purchase commercial cars from you?

On the Job 10 Per Cent

How are you handling your job now—better than you were a month ago or better than you were a year ago? How are you spending less time en route to prospects now than you were six months ago or a year ago? How are you sticking closer to the job now than you formerly were? How are you handling the job better now than formerly? And, how can you handle your job even more efficiently in the future than you are handling it right now?

It won't take very long to go through this list and put down the right ratings. And once this has been done there will be a splendid check-up on activities which will be of assistance in pointing out deficiencies and in indicating ways and means of going right ahead.

In most instances it will probably be found that the rating runs from 80 to 90 per cent and this is a good showing, of course, but why not strive to make it even nearer 100 per cent the next time there is a check-up?

It will also be found to be of advantage while checking up in this way to check up on the equipment with which business is handled.

Important Equipment Check-ups

Are your files or prospects' names in such shape that you can thoroughly understand them and so that a tickler system calls your attention to the right prospects at the right time?

Is your business card right up to the minute and neat and attractive so that

(Continued on page 80)

IF we didn't have something real to back our statement that **FEDERAL** trucks are the Most Modern Trucks sold today ☺ we wouldn't be entitled to your confidence or your name on a **FEDERAL** selling franchise ☺



EDITORIALS



Store Door Delivery

THERE is plenty of evidence at hand to prove that this system would create a great saving wherever installed, and we have often wondered why the railroads in this country are not adopting it. Mr. W. J. L. Banham, one of the foremost exponents of this subject in the country, answered this question in his address recently in New York during the Eleventh Annual Meeting of the Chamber of Commerce of the United States. He said:

"If store door delivery makes possible these savings, why is it not adopted? I have not been able to ascertain any good and sufficient reason, with the exception that the carriers have felt at times that if store door delivery were placed into effect as a carriers' service it might result at a later date in the carriers being required to absorb the teaming charge as part of the through rate. In advocating store door delivery, I have made it clear that the shippers and receivers of freight will be required to pay an extra rate for teaming in addition to the usual freight charges. There seems to be no objections on the part of the shippers to this arrangement and for that reason the carriers should not use this as an objection to store door delivery.

"The second objection to store door delivery seems to be the question of liability for loss and damage to shipments when moving between the freight terminals and the shippers' warehouses. The carriers could protect themselves from claims of this character, if the teaming were part of the carriers' service, by contracts and agreements with the teaming companies operating to and from their terminals. This, however, in my opinion, is a minor detail and can easily be adjusted between the interested parties once the principles of store door delivery are agreed upon.

"If we are to have a modern system of transferring freight, it will be necessary to use modern equipment. The motor truck holds out many advantages for the transfer of terminal freight and under favorable conditions should be able to handle a great volume of freight of which is now being hauled on horse-drawn vehicles, due to the antiquated methods now in use. I urge most strongly that all shipping, teaming and carrier organizations take up this question with a view to solving the freight terminal problem which today is slowing up the freight movement of the country."

We heartily concur with Mr. Banham on the

above and the fact that store door delivery can only be accomplished through the concentrated efforts of "an agency whose sole function would be the development of the plan and the promulgation of its principles." It is up to the railroads to get busy.

Knowing What the Buyer Needs

AT the recent Transportation Meeting of the Society of Automotive Engineers, at Cleveland, one of the speakers, H. B. Wess, of R. H. Macy & Co., stated "that if he had a wheel barrow large enough to carry two hundred bundles and a man strong enough to push it around the city streets, that he would be able to solve one of the greatest delivery problems of the modern department store."

Then he went on to explain what he meant by that statement. Being chairman of the Retail Merchants' Delivery Association he thoroughly knows the problem of the retail merchant. "At the present time," he stated, "the truck manufacturer is offering the same kind of chassis for department store work as would be used for any other kind of business, consequently the department store is forced to use a chassis which is far heavier for bundle delivery work than it need be."

What the department store requires is a light chassis with a special body which will make it possible to stack the bundles so that they can be sorted at the point of loading, and not require resorting after the truck runs across a bump on the road. At the present time the body used for delivering bundles is simply a light panel job with four walls, so to speak.

Mr. Wess also called attention to the fact that it is not speed that the department store shipper is after. So many truck salesmen try to sell the department store owner on the speed of the vehicle, where as a matter of fact, most of the time the vehicle is on the road is consumed by stops, so that the speed is a negligible factor. Of course in suburban delivery and for furniture delivery the heavier and speedier delivery is necessary, but as Mr. Wess pointed out, that is only a small portion of the department stores deliveries.

The foregoing illustrates again our advice to the truck manufacturer that there are many opportunities awaiting the enterprising truck merchant who will develop a vehicle designed for a specific purpose. In other words the vocational idea of selling is here again brought out forcibly.

News of the Trade in Brief

(For Additional News, Personal, Trade and Literature Items, See Pages, 86, 88 and 93 to 96)

New Mark in Motor Vehicle Output

**Production for Year Ending April 30th,
Total 3,208,000; 364,000 Cars and
Trucks Produced in April**

With a production exceeding 364,000 vehicles, all previous records were shattered by the automobile industry in April, according to Alfred Reeves, general manager of National Automobile Chamber of Commerce, in his talk over the "Detroit Free Press" radio, May 1st. Schedules for May and June are big, but after that a seasonal decline may be expected, although with substantial figures certain for the last half of the year.

Mr. Reeves said 3,208,000 motor vehicles (10 per cent of them trucks) were made during the 12 months ending April 30th, and in addition dealers disposed of at least 1,300,000 used cars, making a total sale of 4,500,000 transportation units.

While everything points to good business for the balance of the year, Mr. Reeves calls for caution in commitments.

"Carload shipping reports received by the N. A. C. C. indicate that during the month of April more motor vehicles were made and shipped than ever before in the history of the industry. The figures are 364,000 vehicles, which is 10,000 more than March and 66 per cent greater than April last year," said Mr. Reeves.

"When you stop to think that during the past twelve months the automobile industry has produced more than 3,208,-

000 motor vehicles (about 10 per cent trucks) and that its 38,000 dealers have in addition, marketed approximately 1,300,000 used cars or a total sale of four and a half million motor vehicles, many will question whether this same pace can maintain during the remainder of 1923.

"The outlook for the truck industry is the best in five years. Production in March was 62 per cent greater than February. The five ton truck had the greatest increase, although in numbers the light truck outstrips the field. Trucks were bought for replacements as well as by new customers. This is the result of a demand for more transportation than the railroads can supply; the transportation which comes from increased business, the farmer buying and the increasing use of buses and trucks by the railroads, the trolley lines and by haulage and bus companies.

"Enterprising railroad men are going into this truck and bus business. Their training equips them best for the work.

"The present is a time for conservative optimism. Caution but not cowardice. Everything points to good business for the remainder of the year, but care should be used in connection with commitments. Parts makers are not anxious for the car manufacturer to over order and the wise car manufacturer will not attempt to over-load his dealers.

"Thanks goodness we are not in the state of hysteria that came during the hectic months of 1920. There seems to be more balance among the bankers and among business men generally."

Increased Automotive Exports in February

February Truck Exports Show an Increase of 274 Per Cent in Number Over February 1922

February exports of automotive products, according to the new classification which went into effect on January 1, showed a large increase as compared with the previous month—the total value being \$13,007,011, an increase of 20 per cent.

Exports of passenger cars and trucks accounted for the major part of this increase, exports of the former having increased 46 per cent in number and 37 per cent in value, while shipments of the latter increased 25 per cent in number and 47 per cent in value. The substantial improvement in foreign automotive markets since 1922 is demonstrated in the statement that exports of passenger cars during February registered an increase of 185 per cent in number and 145 per cent in value, as against shipments in February, 1922, while truck shipments showed an increase of 274 per cent in number and 178 per cent in value.

Unit values of passenger cars decreased \$32 while the unit of trucks showed an increase of \$96. Exports of parts increased 94 per cent in quality and only 3 per cent in value. A similar but not so marked a range between quantity and value was shown in January exports as compared with December.

CONVENTIONS

- Atlantic City, N. J., June 3 to 7, 1923, Associated Retail Advertisers' meeting in connection with the annual convention of the Associated Advertising Clubs of the World.
- Atlantic City, N. J., June 7, 1923, National Association of Sales Managers, Chas. F. Abbott, chairman, 26 Madison Ave., Montclair, N. J.
- Atlantic City, N. J., June 25 to 30, 1923—26th annual meeting of the American Society for Testing Materials, Chalfonte-Haddon Hall.
- Atlantic City, N. J., October 7 to 11, 1923—Convention and exhibition of the American Railway Association, at Million Dollar Pier.
- Chicago, Ill., July 23 to 24, 1923—First national conference of automobile trade secretaries and managers under the auspices of the National Automobile Dealers' Association, Hotel Drake.
- Cleveland, O., October 24 to 26, 1923—30th annual convention of the National Association of Farm Equipment Manufacturers, Hotel Statler.
- Detroit, Mich., May 15 to 16, 1923—Spring meeting of the factory service managers of the National Automobile Chamber of Commerce. H. R. Cobleigh, Secretary of Service.
- Detroit, Mich., June 26 to 27, 1923—3rd annual convention of the Automobile Body Builders' Association, Hotel Statler, F. D. Mitchell, secretary-treasurer., 1819 Broadway, New York City.
- Dixville Notch, N. H., June 25 to 29, 1923—Spring convention of Automotive Equipment Association., Balsams.
- Los Angeles, Cal., June 18, 1923—District meeting of the National Automobile Dealers' Association.

Coming Events

- Mobile, Ala., July 23, 1923—Semi-annual meeting of the Alabama Automotive Trades Association.
- Montreal, Canada, May 28 to 31, 1923—Annual spring meeting of the American Society of Mechanical Engineers.
- New York, N. Y., June 4 to 11, 1923—Annual convention of the National Electric Light Association, Hotel Commodore.
- Olympia, Wash., June 29, 1923—District meeting of the National Automobile Dealers' Association.
- Olympia, Wash., July, 1923—Midsummer convention of the Washington Automobile Trade Association.
- Milwaukee, Wis., June 25 to 27, 1923—Convention of the National Team and Truck Owners' Association, Pfister Hotel.
- Portland, Ore., June 25, 1923—District meeting of the National Automobile Dealers' Association.
- San Francisco, Cal., June 21, 1923—District meeting of the National Automobile Dealers' Association.
- Twin Falls, Idaho, July 14 to 15, 1923—Annual meeting of the Idaho Automotive Trade Association.
- Society of Automotive Engineers
- Cleveland, October 25 to 26, 1923—Production meeting.
- Detroit, January, 1924—Annual meeting.
- Spring Lake, N. J.—June 19 to 23, 1923—Summer meeting.
- SHOWS
- Chicago, Ill., September 1 to 7, 1923—National transportation exhibition, transportation exhibition, transportation vehi-

cles in action, including taxicabs, rail-cars, motor buses, trucks and trailers, at Coliseum and Annex, auspices of Motor Truck Industries, Inc.

Fresno, Cal., September 28 to October 5, 1923—Automobile show, auspices of the Fresno Automobile Dealers' Association. Ray W. Wakefield, Mgr.

Green Bay, Wis., August 27 to 30, 1923—Annual automobile show, auspices of Green Bay Association of Commerce, Brown County Fair Grounds. W. F. Kermin, Manager.

Little Rock, Ark., October 8 to 13, 1923—Annual automobile show, auspices of Little Rock Automobile Dealers' Association. A. W. Parke, manager.

Memphis, Tenn., September 23 to 30, 1923—Annual automobile show, Tri-State Fair Grounds. Memphis Automobile Dealers' Association. Thomas H. Smart, manager.

New York, N. Y., June 4 to 9, 1923—Annual electric truck show at New York Edison Co. show rooms, Irving Place. Convention National Electric Light Association, Hotel Commodore.

Sacramento, Cal., September 3 to 8, 1923—Annual automobile show, auspices of Motor Dealers' Association. State Exposition Grounds. H. W. Leonard, manager.

Waco, Texas, October 20 to November 5, 1923—Annual automobile show of Waco Automobile Dealers' Association, Texas Cotton Palace Exposition.

FOREIGN EVENTS

Goteburg, Sweden, May 8 to July 15, 1923—International automobile exposition in connection with the Goteburg Jubilee Exposition.

Paris, France, October 24 to November 2, 1923—Truck and tractor show at Grand Palais.

Electric Truck School a Notable Success

Plans Maturing for Repetition of the Course in New York Next Year

The course of lectures for electric truck owners, operators and garage attendants, recently held under the auspices of the New York Edison Co. proved so successful that plans are already under way for its repetition next year. It was the first attempt that had ever been made to give a systematic course of instruction in the principles of the electric truck and those enrolled, representing many New York business houses, included both employer and employee.

When the course was planned and a fee of a dollar was announced it was hoped that at least 25 and possibly 40 could be enrolled. But the enrollment exceeded 300 in spite of every effort to hold it down. Some of the classes were so large that the lectures had to be repeated. The first lectures were held at the Electric Garage where some laboratory work was included, but after that all the lectures were given in the auditorium of the Consolidated Gas Company Bldg. The committee which conducted the lectures consisted of representatives of the leading manufacturers of electric trucks and the manufacturers of batteries and representatives from the New York Edison Co. Those representing the company were C. R. Skinner, Jr., S. C. Harris and F. C. Henderschott.

The closing session held on April 12 was rather a revelation to many of the electric truck owners. The American Railway Express Company is now the largest operator of motor vehicles in the world and is gradually changing its equipment, increasing the number of its electrics. In addition to E. E. LaSchum, general superintendent of his company, B. K. Rhoads, I. S. Robinson, Paul F. Karst, local transportation superintendent of Philadelphia and vicinity for his company, were also present.

The following program was given:

December 15th—"Chassis," E. L. Clark Commercial Truck Co.

December 29th—"Chassis Construction," E. R. Whitney, president, Commercial Truck Co.

January 11th—"Batteries," G. H. Morris, Electric Storage Battery Co.

January 25th—"Motors and Controllers," H. S. Baldwin, General Electric Co.

February 8th—"Lubrication," G. A. Round, Vacuum Oil Co.

March 1st—"Every Day Care of Batteries," W. Bentley, K W Battery Co.

March 15th—"Charging Equipment, Charging of Storage Batteries, Boards, Plugs and Boosting on the Road," O. Sarvas, Auto Electric Devices Corp.

March 29th—"Management and Operation of Garages," M. V. Middleworth, the Consolidated Gas Co. of New York.

April 12th—"Operation of Trucks," E. E. LaSchum, American Railway Express Co.

Steinmetz Opening Up Fourteen Sections in Eastern Territory

A zone and dealer co-operative plan has been worked out by the Steinmetz Electric Motor Car Corp., Arlington, Baltimore, Md., maker of the Steinmetz electric trucks. The plan will be put into effect first in the eastern territory where 14 different sections have been mapped out or zoned. Certain large cities will comprise a zone, while in other places a zone may comprise a small city and some adjoining territory. No more territory will be given to the dealer than he can intensively cultivate or service. The "key" of the plan is giving smaller territory than customary in other transportation selling fields and a more thorough combing for prospects.

The number of trucks a dealer will be asked to take is based on a quota and on about 2½ per cent of the number of 1-ton trucks in service in the territory.

ATTENTION N. E. L. A. MEN

The Convention Committee of the National Electric Light Association urges that all members who are planning to attend the convention at New York, June 4 to 11, 1923, apply for hotel accommodations at once, through the medium of the advance registration and hotel accommodation application blanks. Only through advance registration can the Committee determine the amount of accommodation needed and the number of sets of advance convention papers to be printed.

For example, the borough of Manhattan, New York City, would have a quota of approximately 127 trucks per year which does not appear to be a large number when it is considered that the electric truck sales generally mean fleet business, either in the first order or by repeats.

The dealer taking over the territory will be asked to make a deposit of \$75 with his contract. If the dealer's quota is five trucks the deposit is returned after the five are purchased. To back up the dealer in sales the manufacturer will conduct a liberal advertising campaign in the newspapers in the dealer's territory and a certain amount of the price of each truck taken by the dealer will be expended in advertising for the dealer.

Each section in the territory will have a district manager whose duty it will be to co-operate with the dealer in sales and service. The dealer who is called upon to make a cost and transportation analysis and who is not familiar with the procedure, etc., will be given aid through the factory transportation engineers who will make the analysis. The dealer will also be supplied with detailed information as to central power stations, charging equipment and its operation and battery service data. It is the plan of the Steinmetz company to aid the dealer in concentrating on sales and to assist him in every possible way to build up a permanent and enterprising business.

New Application Blank for Electric Association

Form for Applying for Membership Gives Detailed Information on the organization

The Automotive Electric Association, organized in 1920, comprising the leading authorized service representatives of the manufacturers of electrical equipment in this country and in Canada, has modified the form utilized for application to membership so that complete details will be available to the association.

The new blank or form is so arranged that the applicant realizes the objects of the association. Printed in large type on the front page of the form is the pledge which the members must observe. It is as follows:

"To improve and stabilize the electrical service station business; to secure recognition of its importance in the field of automobiles as a separate and distinct industry; to operate the service station in a modern and efficient manner; to give prompt and satisfactory service; to use and sell only genuine repair parts; to operate on a live and let live policy when in contact with other members and operators of authorized service stations; to work constantly for the improvement and extension of service facilities; to create in the mind of the motoring public a more favorable impression of automotive service as a whole."

An application for membership must be approved by a member of the board of governors before it is sent to the office of the secretary. The applicant must state his source of supply for parts, etc., whether direct from the manufacturer or from the central service station or distributor. Such details as the job and stock keeping systems, testing equipment and station capacity are required, also the investment in building, stock, tools and equipment, and gross annual business. Details as to the personnel are to be given and include the employees of the service shop and salesmen. This information is, of course, treated confidentially and is essential for many purposes having to do with the promotion of the electrical service station movement for recognition, etc.

The board of governors is actively engaged in promoting the welfare of the association and co-ordinating data from the various members with a view to suggesting policies which will not only improve service but to educate the public to the advantages of the authorized service station with its trained craftsmen and modern equipment. The board will hold a meeting some time this month at which a number of problems will be considered.

The Spencer-Lay Co., Inc., 15 West 37th St., New York City, advertising, has changed its name to the Lay Company, Inc.

Price List of Truck Pneumatic Tire Casings, With Capacities and Inflation Pressures of Larger Sizes

36x6		36x7		36x8		36x9		36x10		36x11		36x12		36x13		36x14		36x15		36x16		36x17		36x18		36x19		36x20		36x21		36x22		36x23		36x24		36x25		36x26		36x27		36x28		36x29		36x30		36x31		36x32		36x33		36x34		36x35		36x36		36x37		36x38		36x39		36x40		36x41		36x42		36x43		36x44		36x45		36x46		36x47		36x48		36x49		36x50		36x51		36x52		36x53		36x54		36x55		36x56		36x57		36x58		36x59		36x60		36x61		36x62		36x63		36x64		36x65		36x66		36x67		36x68		36x69		36x70		36x71		36x72		36x73		36x74		36x75		36x76		36x77		36x78		36x79		36x80		36x81		36x82		36x83		36x84		36x85		36x86		36x87		36x88		36x89		36x90		36x91		36x92		36x93		36x94		36x95		36x96		36x97		36x98		36x99		36x100		36x101		36x102		36x103		36x104		36x105		36x106		36x107		36x108		36x109		36x110		36x111		36x112		36x113		36x114		36x115		36x116		36x117		36x118		36x119		36x120		36x121		36x122		36x123		36x124		36x125		36x126		36x127		36x128		36x129		36x130		36x131		36x132		36x133		36x134		36x135		36x136		36x137		36x138		36x139		36x140		36x141		36x142		36x143		36x144		36x145		36x146		36x147		36x148		36x149		36x150		36x151		36x152		36x153		36x154		36x155		36x156		36x157		36x158		36x159		36x160		36x161		36x162		36x163		36x164		36x165		36x166		36x167		36x168		36x169		36x170		36x171		36x172		36x173		36x174		36x175		36x176		36x177		36x178		36x179		36x180		36x181		36x182		36x183		36x184		36x185		36x186		36x187		36x188		36x189		36x190		36x191		36x192		36x193		36x194		36x195		36x196		36x197		36x198		36x199		36x200		36x201		36x202		36x203		36x204		36x205		36x206		36x207		36x208		36x209		36x210		36x211		36x212		36x213		36x214		36x215		36x216		36x217		36x218		36x219		36x220		36x221		36x222		36x223		36x224		36x225		36x226		36x227		36x228		36x229		36x230		36x231		36x232		36x233		36x234		36x235		36x236		36x237		36x238		36x239		36x240		36x241		36x242		36x243		36x244		36x245		36x246		36x247		36x248		36x249		36x250		36x251		36x252		36x253		36x254		36x255		36x256		36x257		36x258		36x259		36x260		36x261		36x262		36x263		36x264		36x265		36x266		36x267		36x268		36x269		36x270		36x271		36x272		36x273		36x274		36x275		36x276		36x277		36x278		36x279		36x280		36x281		36x282		36x283		36x284		36x285		36x286		36x287		36x288		36x289		36x290		36x291		36x292		36x293		36x294		36x295		36x296		36x297		36x298		36x299		36x300		36x301		36x302		36x303		36x304		36x305		36x306		36x307		36x308		36x309		36x310		36x311		36x312		36x313		36x314		36x315		36x316		36x317		36x318		36x319		36x320		36x321		36x322		36x323		36x324		36x325		36x326		36x327		36x328		36x329		36x330		36x331		36x332		36x333		36x334		36x335		36x336		36x337		36x338		36x339		36x340		36x341		36x342		36x343		36x344		36x345		36x346		36x347		36x348		36x349		36x350		36x351		36x352		36x353		36x354		36x355		36x356		36x357		36x358		36x359		36x360		36x361		36x362		36x363		36x364		36x365		36x366		36x367		36x368		36x369		36x370		36x371		36x372		36x373		36x374		36x375		36x376		36x377		36x378		36x379		36x380		36x381		36x382		36x383		36x384		36x385		36x386		36x387		36x388		36x389		36x390		36x391		36x392		36x393		36x394		36x395		36x396		36x397		36x398		36x399		36x400		36x401		36x402		36x403		36x404		36x405		36x406		36x407		36x408		36x409		36x410		36x411		36x412		36x413		36x414		36x415		36x416		36x417		36x418		36x419		36x420		36x421		36x422		36x423		36x424		36x425		36x426		36x427		36x428		36x429		36x430		36x431		36x432		36x433		36x434		36x435		36x436		36x437		36x438		36x439		36x440		36x441		36x442		36x443		36x444		36x445		36x446		36x447		36x448		36x449		36x450		36x451		36x452		36x453		36x454		36x455		36x456		36x457		36x458		36x459		36x460		36x461		36x462		36x463		36x464		36x465		36x466		36x467		36x468		36x469		36x470		36x471		36x472		36x473		36x474		36x475		36x476		36x477		36x478		36x479		36x480		36x481		36x482		36x483		36x484		36x485		36x486		36x487		36x488		36x489		36x490		36x491		36x492		36x493		36x494		36x495		36x496		36x497		36x498		36x499		36x500		36x501		36x502		36x503		36x504		36x505		36x506		36x507		36x508		36x509		36x510		36x511		36x512		36x513		36x514		36x515		36x516		36x517		36x518		36x519		36x520		36x521		36x522		36x523		36x524		36x525		36x526		36x527		36x528		36x529		36x530		36x531		36x532		36x533		36x534		36x535		36x536		36x537		36x538		36x539		36x540		36x541		36x542		36x543		36x544		36x545		36x546		36x547		36x548		36x549		36x550		36x551		36x552		36x553		36x554		36x555		36x556		36x557		36x558		36x559		36x560		36x561		36x562		36x563		36x564		36x565		36x566		36x567		36x568		36x569		36x570		36x571		36x572		36x573		36x574		36x575		36x576		36x577		36x578		36x579		36x580		36x581		36x582		36x583		36x584		36x585		36x586		36x587		36x588		36x589		36x590		36x591		36x592		36x593		36x594		36x595		36x596		36x597		36x598		36x599		36x600		36x601		36x602		36x603		36x604		36x605		36x606		36x607		36x608		36x609		36x610		36x611		36x612		36x613		36x614		36x615		36x616		36x617		36x618		36x619		36x620		36x621		36x622		36x623		36x624		36x625		36x626		36x627		36x628		36x629		36x630		36x631		36x632		36x633		36x634		36x635		36x636		36x637		36x638		36x639		36x640		36x641		36x642		36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Kelly-Springfield Tire Co., New York, N. Y.	16.10	32.00	34.05	41.60	43.45	51.50	52.00	54.20	87.60	2200	90	120.35	3000	100	155.95	4000	110
Kelly-Springfield Cord, Kant Slip.....									74.35	3500	.....				118.30	6000		.....	.....	.....
Kelly-Springfield Caterpillar.....		40.70	42.80	.....	.....	56.95	.....	.....	61.10	3500	.....				.....	.....		.....	.....	.....
Kelly-Springfield Standard.....		33.90	35.85	.....	.....	46.35	.....	.....	.....	.....	.....				.....	.....		.....	.....	.....
Kenyon Co., Inc., Brooklyn, N. Y.																				
Kenyon Cord, non-skid.....	19.85	.....	.....	49.85	52.50	.....	64.00	66.25	91.50	.....	..	127.50	.....	.....	.....	.....	.....	.....	.....	.....
Keystone Tire & Rubber Co., New York, N. Y.																				
Keystone Cord, non-skid.....	17.60	36.00	38.20	46.60	48.80	58.00	59.80	61.00	90.00	.....	..	.....	.....	.....	.....	.....	.....	.....	.....	.....
Kokomo Rubber Co., Kokomo, Ind.																				
Kokomo Heavy-Duty Cord.....	17.85	36.10	38.25	46.70	49.00	58.20	.....	61.05	91.50	2200	90	.....	.....	.....	.....	.....	.....	.....	.....	.....
Lee Tire & Rubber Co., New York, N. Y.																				
Lee De Luxe Cord.....	18.50	38.00	38.20	46.65	48.85	58.00	62.70	61.00	91.70	.....	..	131.00	.....	.....	170.00	.....	.....	.....	.....	.....
McClaren Rubber Co., Charlotte, N. C.																				
Autocrat Cord, non-skid.....	19.75	37.30	39.55	49.05	51.45	61.10	62.35	64.25	89.85	.....	..	.....	.....	.....	.....	.....	.....	.....	.....	.....
Madison Tire & Rubber Co., Inc., Buffalo, N. Y.																				
Madison Oversize Cord.....	19.75	35.45	38.45	46.65	48.90	58.10	.....	61.00	.....	.....	..	.....	.....	.....	.....	.....	.....	.....	.....	.....
Manhattan Tire & Rubber Co., Mansfield, O.																				
Manhattan Giant Cord.....	22.75	.....	.....	.....	.....	62.65	64.25	.....	91.90	2200	90	.....	.....	.....	178.50	4000	120	.....	.....	.....
Marathon Tire & Rubber Co., Cuyahoga Falls, O.	21.95	36.10	38.85	46.65	48.90	58.10	59.60	61.00	93.00	.....	..	.....	.....	.....	.....	.....	.....	.....	.....	.....
Marathon Angle Tread Cord.....																				
Mason Tire & Rubber Co., Kent, O.																				
Mason True-Valve Cord, non-skid.....	19.65	37.85	.....	48.90	51.30	60.95	62.70	64.05	91.50	2200	90	127.65	3000	100	164.55	4000	110	.....	.....	.....
Meiling Tire & Rubber Co., Kansas City, Mo.																				
Meinger Cord, non-skid.....	18.00	32.40	34.25	41.90	43.90	52.15	.....	54.35	90.90	2200	90	.....	.....	.....	.....	.....	.....	.....	.....	.....
Melling Tire & Rubber Co., N. J.	12.50	21.20	22.85	.....	.....	.....	.....	.....	.....	.....	.....				.....	.....		.....	.....	.....
Michelin Tire Co., Milwaukie, N. J.																				
Michelin Tire Co., Milwaukie, N. J.	17.85	36.10	38.20	46.70	48.90	58.10	59.80	61.00	.....	.....	..	.....	.....	.....	.....	.....	.....	.....	.....	.....
Mid-Continent Tire & Rubber Co., Wichita, Kans.																				
Mid-Continent Tire, Inc., Wichita, Kans.	22.00	38.75	41.15	45.45	47.50	56.90	.....	59.00	92.50	2200	90	.....	.....	.....	.....	.....	.....	.....	.....	.....
Midco Cord, Universal.....																				
Miller Rubber Co., Akron, O.																				
Miller Cord, "Geared to the Road".....	19.25	.....	.....	48.90	51.35	60.80	62.05	63.40	91.45	.....	..	127.65	.....	.....	164.50	.....	.....	.....	.....	.....
Mohawk Rubber Co., Akron, O.																				
Mohawk Cord, non-skid.....	.....	.....	.....	49.00	61.45	62.50	63.80	65.00	95.00	.....	..	132.00	.....	.....	166.00	.....	.....	.....	.....	.....
Murray Rubber Co., Trenton, N. J.																				
Murray Oversize Cord.....	19.75	36.05	38.20	46.65	48.85	58.05	75.45	61.00	.....	.....	..	.....	.....	.....	.....	.....	.....	.....	.....	.....
Murray Heavy-Duty Cord.....	.....	.....	.....	56.00	58.75	69.75	.....	73.20	95.20	2000	90	.....	.....	.....	.....	.....	.....	.....	.....	.....
Norwalk Tire & Rubber Co., Inc., Norwalk, Conn.																				
Norwalk Cord.....	17.30	37.00	40.05	47.80	50.10	58.15	64.00	62.50	93.00	.....	..	130.00	.....	.....	167.50	.....	.....	.....	.....	.....
Norwalk Fabric.....	15.95	24.95	26.95	.....	.....	.....	.....	.....	.....	.....	.....				.....	.....		.....	.....	.....
Leto Fabric, el.....	12.50	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....				.....	.....		.....	.....	.....
Leto Cord.....	15.90	30.10	31.75	38.50	40.35	48.00	.....	50.40	.....	.....	.....				.....	.....		.....	.....	.....
Para Belle Tire & Rubber Co., Mansfield, O.																				
Para Belle Giant Cord.....	22.75	.....	.....	.....	.....	62.65	64.25	.....	91.90	2200	90	.....	.....	.....	178.50	4000	120	.....	.....	.....
Pennsylvania Rubber Co., Jeanette, Pa.																				
Pennsylvania Cord, non-skid.....	17.85	36.05	38.20	46.65	48.85	58.05	59.50	61.00	96.00	.....	..	134.00	.....	.....	173.00	.....	.....	.....	.....	.....
Perfection Tire & Rubber Co., Fort Madison, Ia.																				
Perfection Cord, non-skid.....	19.50	32.40	34.25	41.90	43.90	52.15	53.50	54.75	90.90	2200	90	121.50	3000	100	157.50	4000	110	.....	.....	.....
Standard Fabrics.....	13.75	25.45	27.35	34.05	36.25	42.15	.....	44.75	.....	.....	.....				.....	.....		.....	.....	.....
Powertown Tire Corp., Rochester, N. Y.																				
Powertown Cord, non-skid.....	19.90	37.55	39.65	48.25	50.60	60.50	65.65	63.00	107.35	2200	90	129.85	3400	100	177.70	4000	110	.....	.....	.....
Quaker City Rubber Co., Philadelphia, Pa.																				
Quaker Cord, non-skid.....	20.65	36.05	38.20	46.65	48.85	58.05	63.00	61.00	100.00	.....	..	136.00	.....	.....	.....	.....	.....	.....	.....	.....
Racine Rubber Co., Racine, Wis.																				
Racine Multi-Mile Cord.....	16.50	32.80	34.70	42.40	44.45	52.80	55.95	57.20	88.85	.....	..	126.35	.....	.....	162.80	.....	.....	.....	.....	.....
Reubie Rubber Co., Youngstown, O.																				
Reubie Eagle Cord, non-skid.....	17.95	36.05	38.20	46.65	48.85	58.05	55.40	61.00	87.80	2200	90	129.90	3000	110	167.30	4000	110	.....	.....	.....
Samson Tire & Rubber Corp., Los Angeles, Calif.																				
Samson Heavy Duty Cord.....	17.35	34.45	36.45	44.50	46.65	55.45	.....	58.20	.....	.....	..	.....	.....	.....	.....	.....	.....	.....	.....	.....
Samson Super Size Cord.....	.....	.....	.....	49.40	52.60	61.50	63.80	65.70	85.00	.....	..	.....	.....	.....	.....	.....	.....	.....	.....	.....
Samson S. O. S. Fabric.....	10.65	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....				.....	.....		.....	.....	.....
Samson S. O. S. Cord.....	13.95	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....				.....	.....		.....	.....	.....
Selberling Rubber Co., Akron, O.																				
Selberling All-Tread.....	.....	36.90	.....	45.30	47.60	57.35	59.05	60.60	85.80	.....	..	121.55	.....	.....	167.30	.....	.....	.....	.....	.....
Speckles "Savage" Tire Co., San Diego, Cal.																				
Aristocrat Cord.....	.....	37.95	40.30	49.10	51.50	63.00	63.70	66.20	98.00	.....	..	.....	.....	.....	.....	.....	.....	.....	.....	.....
Trailmaker Cord.....	16.70	29.10	30.70	.....	.....	.....	.....	.....	.....	.....	.....				.....	.....		.....	.....	.....
Standard Tire Co., Willoughby, O.																				
Standard Tire Co., Willoughby, O.	16.95	32.80	34.70	42.40	44.45	52.80	.....	55.45	.....	.....	..	.....	.....	.....	.....	.....	.....	.....	.....	.....
Standard Four Tire Co., Keokuk, Iowa																				
Standard Cord, none-skid.....	16.95	32.80	34.70	42.40	44.45	52.80	.....	55.45	91.65	.....	..	.....	.....	.....	.....	.....	.....	.....	.....	.....
Star Rubber Co., Inc., Akron, O.																				
Star H. D. Cord.....	.....	.....	.....	49.25	51.50	61.05	62.60	64.10	94.10	.....	..	131.60	.....	.....	170.00	.....	.....	.....	.....	.....
Swishart Tire & Rubber Co., Akron, O.																				
Swishart Cord, non-skid.....	19.85	40.10	42.40	51.80	54.30	64.50	.....	67.75	.....	.....	..	.....	.....	.....	.....	.....	.....	.....	.....	.....
Syracuse Rubber Co., Inc., Syracuse, N. Y.																				
Syracuse Cord, non-skid.....	15.50	36.00	38.25	46.50	49.00	58.25	59.75	61.00	.....	.....	..	.....	.....	.....	.....	.....	.....	.....	.....	.....
Thermoid Rubber Co., Trenton, N. J.																				
Thermoid Cord, non-skid.....	20.50	33.05	34.95	42.75	44.80	53.20	54.60	55.80	84.30	2200	90	117.70	3000	100	.....	.....	.....	.....	.....	.....
Traveler Rub. Co. of Bethlehem, Bethlehem, Pa.																				
Traveler Cord, non-skid.....	18.95	36.10	38.25	46.70	49.00	58.20	59.80	61.05	100.65	.....	..	146.00	.....	.....	188.10	.....	.....	.....	.....	.....
United States Tire Co., New York, N. Y.																				
United States Tire Co., New York, N. Y.	.....	.....	.....	44.50	46.65	55.45	57.10	58.20	91.50	2200	90	127.40	3000	100	164.15	.....	.....	.....	.....	.....
Victor Rubber Co., Springfield, Ohio.																				
Victor Cord, non-skid.....	19.00	34.10	36.05	41.90	43.90	52.15	53.50	54.75	82.65	2200	90	.....	.....	.....	.....	.....	.....	.....	.....	.....

The Trucks' Progress Revealed by N.A.C.C. Figures

New Edition of Facts and Figures Tells of Opening of New Lands, Building Up of Schools, Through Cars and Trucks

MOTOR cars and motor trucks are developing the resources of the country. This is the outstanding point in the new edition of "Facts and Figures of the Automobile Industry," published by the National Automobile Chamber of Commerce.

Registration has reached the new peak of 12,239,114. Even allowing for duplications in licensing methods in some states, this means that close to 12,000,000 cars and trucks are actually in use. Production of motor vehicles, 22 per cent ahead of any previous year, reached 2,659,000, of which about 2,500,000 went into the domestic market.

This rapid growth is accounted for by the need in all parts of the country for short line transportation to develop the territories not served by rail lines, and to supplement the work begun by the railroads.

Short Line Hauling Increases

Suburban use of motor cars and motor trucks is an example. Around our big cities are areas of land used by home seekers. Without motor vehicles only land within walking distance of a railroad station has been readily available. With the motor vehicle, each station becomes a center for home development for a radius of several miles.

Long Island, N. Y., a part of the area in the Metropolitan District illustrates this point. In 1917 there were 11,800 motor cars in suburban counties of this island, and there were 50,796,000 passenger fares on the railroads serving the territory. In 1922 there were 41,000 cars, and the railroad passenger total had grown to 79,656,000. In the same period motor trucks increased from 2482 to 10,000, and the freight carried by the railroads advanced from 5,271,000 to 6,028,000 tons. There have been several thousand new dwellings per year constructed in this region: 1922 set a new mark with 23,336.

The rail lines are not leaving it to private individuals to discover the advantages that may be obtained through developing territory intensively by use of the motor vehicle.

Forty railroads are using flanged wheel motor buses on their short lines. The American Short Line Railroad Association finds that many lines operate these buses at a cost of from 10 to 25 cents a mile including all charges, as compared with the cost of 65 cents to \$1.00 to the rail line in the operation of steam trains. Where only a one or two-car train is needed on the short line route, the saving in the use of the gasoline car is obvious.

Sixty electric lines are operating buses in their outlying territories. The use of the motor bus in this way permits the trolley lines to render additional service without the high capital cost of laying out new tracks in sparsely settled territory.

The motor car and motor truck are not only developers of business in new territory when in the hands of the ultimate

OUTSTANDING MOTOR FACTS OF 1922

Registration of cars and trucks in the U. S., 12,239,114
Production — 2,659,000 (including Canadian plants of U. S. companies)
60 electric lines operate motor buses on short lines
40 railroads are using motor buses on short lines
1838 new consolidated rural schools established
20,000 miles of highways built in 1922
Total highway mileage in the U. S., 2,819,386
78,500 cars and trucks exported
2 states and 28 cities reduce their motor vehicle fatalities

consumer, but the manufacture of these vehicles has a large bearing on the prosperity of other industries. The motor industry in 1922 was the third largest rail shipper of the manufactured articles classification, as shown by the commodity statistics of the Interstate Commerce Commission.

We find petroleum and its products was first in this group, an article which is consumed chiefly in automobile use.

The manufacture of cars and trucks calls for 36 per cent of the plate glass supply, 2 per cent of tin, 10 per cent of copper and 25 per cent of aluminum.

Motor Truck Helping Rural Schools

Motor transportation has had a stimulating effect in the development of rural schools. There has been a growing tendency to consolidate the one-room buildings into central schools, and to transport the children from the different districts by bus. There are now over 12,500 consolidated schools in the country, 1,838 being established this year. Reports from school department heads throughout the country indicate that transportation was provided for 568,000 children, and that motor vehicles carried 47 per cent of these passengers.

The advent of the motor car has restored the highway to its old-time im-

portance. The road which leads past a man's house leads eventually to a main highway, which in turn will carry him in a short time to some larger industrial center. This possibility of the highway in abolishing desolation has led to great activity in the increase of road building. Twenty thousand miles of highways were built in 1922; 11,400 of these were Federal-aid roads. A check-up by the U. S. Bureau of Public Roads shows that there are 2,819,386 miles of highway in the United States, of which 350,000 have some sort of improved surface.

Fewer Fatalities

The safe operation of motor vehicles is on the increase. Although the total number of motor fatalities for the nation in 1922 was 14,000, larger by 1,500 than the preceding year, yet two states and thirty-eight cities show that the highway hazards can be reduced. Connecticut lowered its motor fatality record from 235 in 1921 to 206 in 1922 and Massachusetts dropped from 544 to 522. Cleveland, Ohio; Columbus, Ohio; Hartford, Connecticut; Kansas City, Missouri; Omaha, Nebraska; Spokane, Washington; Springfield, Massachusetts; St. Paul, Minnesota; Tacoma, Washington; and Portland, Oregon, are among cities which lowered their fatality rate in the past year.

Tire Production Running 45,000,000 a Year

A total of 225,216,753 pounds of crude rubber were used in the manufacture of automobile and motorcycle tires in the United States during the last six months of 1922. At the beginning of 1923 there were about 150,000 tire workers and makers in the United States and about 200,000 tire dealers and salesmen.

The large increase in production of automobiles within the last nine years is responsible for an increase of 326 per cent in tire production.

It is estimated that 75 out of every 100 passenger car owners stored their cars during the winter season prior to 1922. Last year, however, about 75 per cent of the owners used their cars throughout the entire year.

Tire production at the present time is said to be running at the rate of about 45,000,000 pneumatic and solid tires a year and if production maintains the pace set in January, it will easily exceed 50,000,000 tires. This will not be excessive production as there are 12,500,000 motor vehicles in the country and 3,000,000 additional ones are expected to be manufactured this year.

Replacement Table—Corrected Monthly

Including Piston Ring Sizes, Carburetor Sizes, Hose Sizes, Fan Belt Sizes, Brake Lining Sizes and Truck Frame Dimensions

Note: Under Carburetor Inlet Diameter Will be Found Either the Size of Main Air Intake or the Gasoline Fuel Line

Fan Belt Type: V—V-Shape, F—Flat, R—Round

NAME, MODEL AND TONNAGE	ENGINE										BRAKE LINING								FRAME						
	Piston Rings		Carburetor			Upper Hose		Lower Hose		Fan Belt			Service				Emergency				Length		Width		
	No. per Cyl.	Width	Outlet Diameter	Inlet Diameter	Vertical or Horizontal	Length	Width	Length	Width	Length	Width	Type	Length	Width	Thickness	No. of Pieces	Length	Width	Thickness	No. of Pieces	Back of Driver's Seat	Driver's Seat to Center of Rear Axle	Over All	Over All	Clearance at Lowest Point of Chassis
Ace, Series A-1½	3	1	1	1	V	7	1½	8	1½	40	5	F	12	3½	¼	4	12	3½	¼	4	122	76	215	32	9
Ace, Series A-2	3	1	1	1	V	10	1½	11	1½	42	5	F	13	3½	¼	4	13	3½	¼	4	Opt	85	241	32	9½
Ace 60-3	3	1	1	1	V	10	1½	11	1½	42	5	F	13	3½	¼	4	13	3½	¼	4	Opt	84	241	32	9½
Acme 20-1	3	1	1	1	H	10	1½	11	1½	38	4	V	12	3	¼	2	12	3	¼	2	110	63	194	34	11
Acme 30-1½	3	1	1	1	V	10	1½	11	1½	38	4	V	12	3	¼	2	12	3	¼	2	110	63	194	34	10½
Acme 40-2	4	1	1	1	V	8	1½	11	1½	40	4	F	12	3	¼	2	12	3	¼	2	123	74	208	34	9½
Acme 40L-2	4	1	1	1	V	11	1½	12	1½	39	4	F	13	3	¼	2	13	3	¼	2	123	74	214	34	9½
Acme 60-2½	4	1	1	1	V	11	1½	12	1½	39	4	F	13	3	¼	2	13	3	¼	2	132	79	223	34	10
Acme 60L-3	4	1	1	1	V	11	1½	12	1½	41	4	F	13	3	¼	2	13	3	¼	2	140	79	235	34	10
Acme K (Bus)	4	1	1	1	V	10	1½	12	1½	41	4	F	15½	3	¼	2	15½	3	¼	2	260	168	312	41	6
Acme 90-3½	4	1	1	1	V	10	1½	12	1½	41	4	F	15½	3	¼	2	15½	3	¼	2	150	95	243	36	10½
Acme 90L-4	4	1	1	1	V	10	1½	12	1½	40	4	F	15½	3	¼	2	15½	3	¼	2	153	96	255	37	10½
Acme 125-5	4	1	1	1	V	10	1½	12	1½	40	4	F	18	4	¼	2	18	4	¼	2	159	99	261	37	10
American La France 1R-¾	3	1	1	1	H	9	1½	10	1½	45	1	...	...	...	...	...	48¾	2	...	...	108	60	207	...	10
American La France 2R-2	3	1	1	1	H	9	1½	9	1½	40	3	...	...	...	...	...	17	3	...	...	156	98	252	...	10
American La France 2R-2	3	1	1	1	H	9	1½	9	1½	40	3	...	...	...	...	...	17	3	...	...	132	81	231	...	10
American La France 3R-3½	3	1	1	1	H	9	1½	9	1	40	3	...	...	...	...	...	21	4	...	...	144	90	243	...	9
American La France 3R-3½	3	1	1	1	H	9	1½	9	1	40	3	...	...	...	...	...	21	4	...	...	168	104	267	...	9
American La France 3R-3½	3	1	1	1	H	9	1½	9	1	40	3	...	...	...	...	...	21	4	...	...	192	114	291	...	9
American La France 5R-5	3	1	1	1	H	9	1½	9	1	40	3	...	...	...	...	...	21	4	...	...	144	90	243	...	10
American La France 5R-5	3	1	1	1	H	9	1½	9	1	40	3	...	...	...	...	...	21	4	...	...	168	104	267	...	10
American La France 5R-5	3	1	1	1	H	9	1½	9	1	40	3	...	...	...	...	...	21	4	...	...	192	114	291	...	10
Armleder 21-1½	4	1	1	1	V	12	1½	16	1½	31	2	F	12	3	¼	4	12	3	¼	4	Opt	67	218	32	9½
Armleder 40B-1½	4	1	1	1	V	9½	1½	11	1½	33	2	F	12	3	¼	4	12	3	¼	4	Opt	74	217	32	9½
Armleder 40C-1½	4	1	1	1	V	8½	1½	11	1½	34	1½	F	12	3	¼	4	12	3	¼	4	Opt	74	217	32	9½
Armleder KWB-3½	4	1	1	1	V	12	1½	16	1½	35	2	F	37	3	...	1	16	3	...	...	Opt	89	261	36	8
Armleder KWC-3½	4	1	1	1	V	10	1½	16	1½	35	2	F	37	3	...	1	16	3	...	...	Opt	89	261	36	8
Armleder HWB-2½	4	1	1	1	V	9½	1½	11	1½	33	2	F	13	3	¼	4	13	3	¼	4	Opt	74	217	32	10
Armleder HWC-2½	4	1	1	1	V	8½	1½	11	1½	34	1½	F	13	3	¼	4	13	3	¼	4	Opt	74	217	32	10
Atco B1½	4	1	1	1	V	11	1½	11	1½	31	2	F	25	2	...	4	18	2	...	...	109	...	...	...	32
Atco B1-1½	4	1	1	1	V	11	1½	11	1½	31	2	F	46	2	...	4	46	2	...	...	109	...	...	...	32
Atco A-2½	4	1	1	1	V	12	1½	11	1½	33	1½	F	25	2	...	4	18	2	...	...	124	...	...	...	33
Atlas 22-1	3	1	1	1	V	10	1½	11	1	33	1½	F	40	2	...	2	22½	2	...	...	84	...	...	...	33½
Atterbury 20R-1½	4	1	1	1	V	8	1½	14	1½	38	1½	F	11	1	...	4	11	1	...	...	122	72	211	34	9½
Atterbury 22C-2½	4	1	1	1	V	10½	1½	16	1½	40	1½	F	13	1	...	4	13	1	...	...	129	78	225	34	9½
Atterbury 22D-3½	4	1	1	1	V	10½	1½	16	1½	40	1½	F	15	1	...	4	15	1	...	...	142	93	242	37½	8
Atterbury 8E-5	4	1	1	1	V	14	2	20	2	40	2	F	17	4	...	4	17	4	...	...	157	80	263	37½	10
Autocar XXI-F-1½	4	1	1	1	V	3-4	1½	5	1½	...	...	...	16	2	...	4	13	2	...	...	91	67	156	34	9½
Autocar XXI-G-1½	4	1	1	1	V	3-4	1½	5	1½	...	...	...	16	2	...	4	13	2	...	...	114	90	179	34	9½
Autocar XXVI-5	3	1	1	1	V	3½	1½	3½	1½	49	2	F	25	2	...	4	25	2	...	...	140	80	223	34½	10
Autocar XXVI-5	3	1	1	1	V	3½	1½	3½	1½	49	2	F	25	2	...	4	25	2	...	...	176	116	259	34½	10
Autocar XXVII-2	3	1	1	1	V	3½	1½	3½	1½	47	2	F	22	2	...	4	22	2	...	...	131	76	213	34½	10½
Autocar XXVII-2	3	1	1	1	V	3½	1½	3½	1½	47	2	F	22	2	...	4	22	2	...	...	155	100	237	34½	10½
Available H-1½	4	1	1	1	V	11	1½	14	1½	40	2	F	48	2	...	2	36	2	...	...	120	80	201	32	9
Available H2	4	1	1	1	V	12	1½	14	1½	40	2	F	48	2	...	2	36	2	...	...	120	84	212	32	9
Available H-2½	4	1	1	1	V	11	1½	14	1½	40	2	F	13½	3	...	4	13½	3	...	...	144	85	226	32	9
Available H3½	4	1	1	1	V	12	1½	14	1½	42	2	F	16	3	...	4	16	3	...	...	168	106	254	36	9
Available H5	4	1	1	1	V	12	1½	16	2	40	2	F	18	4	...	4	18	4	...	...	168	112	263	38	9
Avery 1	3	1	1	1	V	10	2	6½	2	31	1½	F	19½	2	...	4	18½	2	...	...	85	49	160	34	13
Bell M-1	4	1	1	1	V	10	2	10	1½	32	2	F	36	2½	...	1	42	3	...	...	110	...	...	...	34
Bell E-1½	4	1	1	1	V	10	2	10	1½	32	2	F	39	2½	...	1	48	3	...	...	114	...	...	...	34
Bell O-2½	4	1	1	1	V	10	2	10	1½	32	2	F	48	2½	...	1	54	3	...	...	126	...	...	...	34
Bessemer G-1	3	1	1	1	V	11½	2	10	2½	42	1	V	46	2	...	2	44	2	...	...	98½	58	182	34	...
Bessemer H-2-1½	3	1	1	1	V	11½	2	10	2½	43	1	V	16	2	...	8	16	2	...	...	116	76	203	34	...
Bessemer J2-2½	3	1	1	1	V	12	1½	5	1	36	1½	F	18	2	...	8	18	2	...	...	142	92	229	34	...
Bessemer K2-4	3	1	1	1	V	11½	2	10	2½	39	1½	F	55	3	...	2	33	4	...	...	157½	108	249	38	...
Bethlehem KN-1	3	1	1	1	V	8½	2	8	2	35	1½	F	49	2	...	1	20	2	...	...	89	56	175	32	10½
Bethlehem GN-2	3	1	1	1	V	8½	2	9	2	40	1½	F	52	2	...	1	37	2	...	...	116	74	208	34	9½
Bethlehem HN-3	3	1	1	1	V	8½	2	9	2	40	1½	F	61	2	...	1	47	2	...	...	134	81	226	34½	8½
Brinton C-1½	3	1	1	1	V	11	1½	13	1½	33	1	F	39	2	...	1	38	2	...	...	118	...	...	...	33
Brinton D-2½	3	1	1	1																					

Replacement Table—Continued

NAME, MODEL AND TONNAGE	ENGINE										BRAKE LINING				FRAME									
	Piston Rings		Carburetor		Upper Hose		Lower Hose		Fan Belt		Service		Emergency		Length		Width							
	No. per Cyl.	Width	Outlet Diameter	Inlet Diameter	Vertical or Horizontal	Length	Width	Length	Width	Length	Width	Length	Width	Thickness	No. of Pieces	Length	Width	Thickness	No. of Pieces	Back of Driver's Seat	Driver's Seat to Center of Rear Axle	Over All	Over All	Clearance at Lowest Point of Chassis
Clydesdale 42-1½-2	3	1	1	1	V	15	2	12	2	41	3	12	3	1	4	117	34	34	34	117	35	193	34	34
Clydesdale 20-1-1½	3	1	1	1	V	15	2	12	2	41	3	11	3	1	4	95	34	34	34	95	35	210	34	34
Clydesdale 18-¾-1½	3	1	1	1	V	15	2	12	2	41	3	11	3	1	4	109	34	34	34	109	35	228½	34	34
Clydesdale 10-¾-1½	3	1	1	1	V	9	2	9	2	41	3	11	3	1	4	109	34	34	34	109	35	228½	34	34
Clydesdale 10A-1-¾-1½	3	1	1	1	V	9	2	9	2	41	3	11	3	1	4	109	34	34	34	109	35	228½	34	34
Commerce 9-1500	3	1	1	1	V	10	2	10	2	44	3	50	2	2	2	92%	53%	193	34	92%	75	210	34	34
Commerce 14B-3000	4	1	1	1	V	10	2	9½	1½	39¾	3	11	3	1	4	117	34	34	34	117	35	228½	34	34
Commerce 25B-5000	4	1	1	1	V	9½	1½	15½	1½	42	3	13	3	1	4	132	34	34	34	132	35	228½	34	34
Concord A-2	4	1	1	1	H	11	2	9½	1½	34	2	12	3	1	4	108	34	34	34	108	35	228½	34	34
Concord AX-2	4	1	1	1	H	11	2	9½	1½	34	2	12	3	1	4	122	34	34	34	122	35	228½	34	34
Concord B-3	4	1	1	1	H	11	2	9½	1½	34	2	13½	3	1	4	122	34	34	34	122	35	228½	34	34
Concord BX-3	4	1	1	1	H	11	2	9½	1½	34	2	13½	3	1	4	155%	32	32	32	155%	32	228½	34	34
Corbitt S-¾	3	1	1	1	V	8	2	14	2	38	1	19	2	2	2	105	34	34	34	105	35	228½	34	34
Corbitt D-1½	3	1	1	1	V	8	2	14	2	38	1	45½	2	2	1	120	34	34	34	120	35	228½	34	34
Corbitt C-2	3	1	1	1	V	14	1½	13	1½	36	1	51½	2	2	1	138	35	35	35	138	36	228½	34	34
Corbitt B-2½	3	1	1	1	V	14	1½	13	1½	36	1	51½	2	2	1	138	35	35	35	138	36	228½	34	34
Corbitt AA-5	3	1	1	1	V	13	1	8	1	36	2	69	1	1	1	160	38	38	38	160	39	228½	34	34
Corbitt A-4	3	1	1	1	V	13	2	14	2	36	1	64	2	2	1	160	35	35	35	160	36	228½	34	34
Cyclone A-3000	3	1	1	1	V	16	2	16	2	32½	1½	21½	2	1	4	113	34	34	34	113	35	228½	34	34
Day-Elder AN-1½	3	1	1	1	V	8	1½	1	1½	1	1	3	1	4	108	35	35	35	108	36	228½	34	34	
Day-Elder BN-2	3	1	1	1	V	6	1½	1	1½	1	1	3	1	4	120	35	35	35	120	36	228½	34	34	
Day-Elder DN-2½	3	1	1	1	V	7	1½	1	1½	1	1	3	1	4	125	35	35	35	125	36	228½	34	34	
Day-Elder CN-3	3	1	1	1	V	10½	2	1	1½	1	1	3	1	4	123	35	35	35	123	36	228½	34	34	
Day-Elder FN-4	3	1	1	1	V	6	1½	1	1½	1	1	3	1	4	148	35	35	35	148	36	228½	34	34	
Day-Elder EN-5-6	4	1	1	1	V	12	2	1	1½	1	1	4	1	4	155	37	37	37	155	38	228½	34	34	
Dearborn BW-2	3	1	1	1	V	8½	2	6	1	37	1	18	2	2	2	130	32	32	32	130	33	228½	34	34
Dearborn F-1½	3	1	1	1	V	12	2	8	1	37	1	16½	2	2	2	96½	34	34	34	96½	35	228½	34	34
Dearborn C-1	3	1	1	1	V	10	2	8	2	40	1½	38	2	2	1	107	32	32	32	107	33	228½	34	34
Defiance B-1½	3	1	1	1	V	10	2	8	2	40	1½	45	2	2	1	116	34	34	34	116	35	228½	34	34
Defiance 48-2	3	1	1	1	V	10	2	8	2	40	1½	54	2	2	1	116	34	34	34	116	35	228½	34	34
Defiance D	3	1	1	1	V	10	2	8	2	40	1½	45	2	2	1	120	34	34	34	120	35	228½	34	34
Defiance E	3	1	1	1	V	10	2	8	2	40	1½	54	2	2	1	120	34	34	34	120	35	228½	34	34
Defiance EL	3	1	1	1	V	10	2	8	2	40	1½	54	2	2	1	140	34	34	34	140	35	228½	34	34
Denby 31-1½	3	1	1	1	V	9	2	12	2	41	1	8	2	2	2	97%	34	34	34	97%	35	228½	34	34
Denby 33-2	3	1	1	1	V	9	2	12	2	41	1	8½	2	2	2	120	33½	33½	33½	120	34	228½	34	34
Denby 35-3	3	1	1	1	V	8	1½	14½	1½	34	1½	51	3	2	2	143½	33½	33½	33½	143½	34	228½	34	34
Denby 27-4	3	1	1	1	V	13	1	16½	1	38	1	58	2	2	2	140	34	34	34	140	35	228½	34	34
Denby 210-5	3	1	1	1	V	13	1	16½	1	38	1	89	2	2	2	140	34	34	34	140	35	228½	34	34
Dependable Dispatch A-1½	4	1	1	1	V	14	2	15	1	37	2	53½	2	2	1	108	33½	33½	33½	108	34	228½	34	34
Dependable C-2	4	1	1	1	V	14	2	15	1	37	2	53½	2	2	1	121	33	33	33	121	34	228½	34	34
Dependable D-2½	4	1	1	1	V	10	2	11½	1	37	2	53	2	2	1	140	33	33	33	140	34	228½	34	34
Dependable E-3	4	1	1	1	V	10	2	11½	1	37	2	63	2	2	1	152	33	33	33	152	34	228½	34	34
Dependable G-3½	4	1	1	1	V	13	2	13	1	37	2	63	2	2	1	170	33	33	33	170	34	228½	34	34
Diamond T-O3-1-1½	3	1	1	1	V	9	1½	6	1	35	2	48	2	2	2	100	34	34	34	100	35	228½	34	34
Diamond T-FS&T-1½	3	1	1	1	V	9	1½	6	1	35	2	11½	3	4	4	Opt	Opt	Opt	Opt	Opt	Opt	Opt	Opt	Opt
Diamond T-U2-2½	3	1	1	1	V	9	1½	8	1	35	2	13	3	4	4	Opt	Opt	Opt	Opt	Opt	Opt	Opt	Opt	Opt
Diamond TK-3½	3	1	1	1	V	10	1½	10	1	35	2	15½	3	4	4	Opt	Opt	Opt	Opt	Opt	Opt	Opt	Opt	Opt
Diamond T-EL-5	3	1	1	1	V	10	1½	10	1	35	2	18	4	4	4	Opt	Opt	Opt	Opt	Opt	Opt	Opt	Opt	Opt
Diamond T-S-5	3	1	1	1	V	9	2	21	2	40%	2	18	4	4	4	Opt	Opt	Opt	Opt	Opt	Opt	Opt	Opt	Opt
Diehl A	3	1	1	1	V	11	1½	8	1½	41	1	28	2	2	2	90	48	174	11	90	49	174	11	11
Dixon Model D	4	1	1	1	V	11	1½	9	1½	42	1	13	3½	4	4	126	71	221½	34½	126	72	221½	34½	34½
Dixon Model C	4	1	1	1	V	12	1½	10	1½	42	1	13	3½	4	4	Opt	71	221½	36	Opt	72	221½	36	9½
Dixon Model A	4	1	1	1	V	9	1½	10	1½	42	1	13	3½	4	4	Opt	71	221½	36	Opt	72	221½	36	9½
Dodge Brothers-¾	4	1	1	1	V	18	2	18	2	36	1	10½	2	2	2	43	35	166	38	43	36	166	38	10½
D-Olt	3	1	1	1	V	2	1½	6½	1½	42½	2	13½	3	4	4	142½	96½	233½	34	142½	97	233½	34	9
Dorris K-4-2	3	1	1	1	V	2½	1½	6½	1½	42½	2	15½	3	4	4	178½								

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Replacement Table—Continued

NAME, MODEL AND TONNAGE		ENGINE										BRAKE LINING				FRAME								
		Piston Rings		Carburetor		Upper Hose		Lower Hose		Fan Belt		Service		Emergency		Length		Width						
																Back of Driver's Seat	Driver's Seat to Center of Rear Axle	Over All	Over All	Clearance at Lowest Point of Chassis				
No. per Cyl.	Width	Outlet Diameter	Inlet Diameter	Vertical or Horizontal	Length	Width	Length	Width	Length	Width	Type	Length	Width	Thickness	No. of Pieces	Length	Width	Thickness	No. of Pieces	Back of Driver's Seat	Driver's Seat to Center of Rear Axle	Over All	Over All	Clearance at Lowest Point of Chassis
G.M.C. K-20	4	1 1/4	1 1/4	V	10	1 1/4	9 1/2	1 1/4	37 1/2	1 1/4	V	49 1/2	2 3/4	1/8	2	47	15 1/2	3 1/4	2	191	87 1/2	242 1/2	33	10 1/2
G.M.C. K-71	4	1 1/4	1 1/4	V	11	1 1/4	9 1/2	1 1/4	37 1/2	1 1/4	V	15 1/2	2 3/4	1/8	2	47	15 1/2	3 1/4	2	191	87 1/2	242 1/2	33	10 1/2
G.M.C. K-101	4	1 1/4	1 1/4	V	10	1 1/4	9 1/2	1 1/4	37 1/2	1 1/4	V	17 1/2	2 3/4	1/8	2	47	15 1/2	3 1/4	2	191	87 1/2	242 1/2	33	10 1/2
G.M.C. K-41	4	1 1/4	1 1/4	V	9	1 1/4	9 1/2	1 1/4	37 1/2	1 1/4	V	13	2 3/4	1/8	2	47	15 1/2	3 1/4	2	191	87 1/2	242 1/2	33	10 1/2
Graham Bros.	3	1 1/4	1 1/4	V	12	1 1/4	9 1/2	1 1/4	37 1/2	1 1/4	V	48 1/2	2 3/4	1/8	2	47	15 1/2	3 1/4	2	191	87 1/2	242 1/2	33	10 1/2
Gramm-Pioneer 10 Speed-1	3	1 1/4	1 1/4	V	10 1/4	1 1/4	9 1/2	1 1/4	37 1/2	1 1/4	V	19 1/2	2 3/4	1/8	2	47	15 1/2	3 1/4	2	191	87 1/2	242 1/2	33	10 1/2
Gramm-Pioneer 15-1 1/2-2	3	1 1/4	1 1/4	V	10 1/4	1 1/4	9 1/2	1 1/4	37 1/2	1 1/4	V	48 1/2	2 3/4	1/8	2	47	15 1/2	3 1/4	2	191	87 1/2	242 1/2	33	10 1/2
Gramm-Pioneer 65-1 1/2-2	3	1 1/4	1 1/4	V	10 1/4	1 1/4	9 1/2	1 1/4	37 1/2	1 1/4	V	48 1/2	2 3/4	1/8	2	47	15 1/2	3 1/4	2	191	87 1/2	242 1/2	33	10 1/2
Gramm-Pioneer 125	3	1 1/4	1 1/4	V	11	1 1/4	9 1/2	1 1/4	37 1/2	1 1/4	V	22 1/2	2 3/4	1/8	2	47	15 1/2	3 1/4	2	191	87 1/2	242 1/2	33	10 1/2
Gramm-Pioneer 30-3	3	1 1/4	1 1/4	V	11	1 1/4	9 1/2	1 1/4	37 1/2	1 1/4	V	22 1/2	2 3/4	1/8	2	47	15 1/2	3 1/4	2	191	87 1/2	242 1/2	33	10 1/2
Gramm-Pioneer 75P-3 1/2	3	1 1/4	1 1/4	V	11	1 1/4	9 1/2	1 1/4	37 1/2	1 1/4	V	22 1/2	2 3/4	1/8	2	47	15 1/2	3 1/4	2	191	87 1/2	242 1/2	33	10 1/2
Gramm-Pioneer 40-4	3	1 1/4	1 1/4	V	11	1 1/4	9 1/2	1 1/4	37 1/2	1 1/4	V	22 1/2	2 3/4	1/8	2	47	15 1/2	3 1/4	2	191	87 1/2	242 1/2	33	10 1/2
Gramm-Pioneer 50-5-6	3	1 1/4	1 1/4	V	11	1 1/4	9 1/2	1 1/4	37 1/2	1 1/4	V	22 1/2	2 3/4	1/8	2	47	15 1/2	3 1/4	2	191	87 1/2	242 1/2	33	10 1/2
G. W. W.	3	1 1/4	1 1/4	V	12	1 1/4	9 1/2	1 1/4	37 1/2	1 1/4	V	15 1/2	2 3/4	1/8	2	47	15 1/2	3 1/4	2	191	87 1/2	242 1/2	33	10 1/2
Hall 2-Worm-2 1/2	3	1 1/4	1 1/4	V	12 1/2	1 1/4	9 1/2	1 1/4	37 1/2	1 1/4	V	18	2 3/4	1/8	2	47	15 1/2	3 1/4	2	191	87 1/2	242 1/2	33	10 1/2
Hall 3 1/2-Worm	3	1 1/4	1 1/4	V	12 1/2	1 1/4	9 1/2	1 1/4	37 1/2	1 1/4	V	18	2 3/4	1/8	2	47	15 1/2	3 1/4	2	191	87 1/2	242 1/2	33	10 1/2
Hall 5-Worm	3	1 1/4	1 1/4	V	12 1/2	1 1/4	9 1/2	1 1/4	37 1/2	1 1/4	V	18	2 3/4	1/8	2	47	15 1/2	3 1/4	2	191	87 1/2	242 1/2	33	10 1/2
Hall 7-Chain	3	1 1/4	1 1/4	V	11	1 1/4	9 1/2	1 1/4	37 1/2	1 1/4	V	45	2 3/4	1/8	2	47	15 1/2	3 1/4	2	191	87 1/2	242 1/2	33	10 1/2
Harvey WOA-2	4	1 1/4	1 1/4	V	12	1 1/4	9 1/2	1 1/4	37 1/2	1 1/4	V	50 1/2	2 3/4	1/8	2	47	15 1/2	3 1/4	2	191	87 1/2	242 1/2	33	10 1/2
Harvey WFB-2 1/2	4	1 1/4	1 1/4	V	12	1 1/4	9 1/2	1 1/4	37 1/2	1 1/4	V	50 1/2	2 3/4	1/8	2	47	15 1/2	3 1/4	2	191	87 1/2	242 1/2	33	10 1/2
Harvey WHB-3 1/2	4	1 1/4	1 1/4	V	12	1 1/4	9 1/2	1 1/4	37 1/2	1 1/4	V	50 1/2	2 3/4	1/8	2	47	15 1/2	3 1/4	2	191	87 1/2	242 1/2	33	10 1/2
Harvey WFT-6	4	1 1/4	1 1/4	V	12	1 1/4	9 1/2	1 1/4	37 1/2	1 1/4	V	50 1/2	2 3/4	1/8	2	47	15 1/2	3 1/4	2	191	87 1/2	242 1/2	33	10 1/2
Harvey WHT-10	4	1 1/4	1 1/4	V	12	1 1/4	9 1/2	1 1/4	37 1/2	1 1/4	V	50 1/2	2 3/4	1/8	2	47	15 1/2	3 1/4	2	191	87 1/2	242 1/2	33	10 1/2
Hawkeye O.	4	1 1/4	1 1/4	V	12	1 1/4	9 1/2	1 1/4	37 1/2	1 1/4	V	50 1/2	2 3/4	1/8	2	47	15 1/2	3 1/4	2	191	87 1/2	242 1/2	33	10 1/2
Hawkeye K.	4	1 1/4	1 1/4	V	12	1 1/4	9 1/2	1 1/4	37 1/2	1 1/4	V	50 1/2	2 3/4	1/8	2	47	15 1/2	3 1/4	2	191	87 1/2	242 1/2	33	10 1/2
Hawkeye M.	4	1 1/4	1 1/4	V	14	1 1/4	9 1/2	1 1/4	37 1/2	1 1/4	V	50 1/2	2 3/4	1/8	2	47	15 1/2	3 1/4	2	191	87 1/2	242 1/2	33	10 1/2
Hawkeye N.	4	1 1/4	1 1/4	V	14	1 1/4	9 1/2	1 1/4	37 1/2	1 1/4	V	50 1/2	2 3/4	1/8	2	47	15 1/2	3 1/4	2	191	87 1/2	242 1/2	33	10 1/2
Hendrickson N-2 1/2	3	1 1/4	1 1/4	V	12	1 1/4	9 1/2	1 1/4	37 1/2	1 1/4	V	50 1/2	2 3/4	1/8	2	47	15 1/2	3 1/4	2	191	87 1/2	242 1/2	33	10 1/2
Hendrickson M-3 1/2	3	1 1/4	1 1/4	V	12	1 1/4	9 1/2	1 1/4	37 1/2	1 1/4	V	50 1/2	2 3/4	1/8	2	47	15 1/2	3 1/4	2	191	87 1/2	242 1/2	33	10 1/2
Hendrickson K-5	3	1 1/4	1 1/4	V	12	1 1/4	9 1/2	1 1/4	37 1/2	1 1/4	V	50 1/2	2 3/4	1/8	2	47	15 1/2	3 1/4	2	191	87 1/2	242 1/2	33	10 1/2
Hurlburt A1 1/2-2	3	1 1/4	1 1/4	V	12	1 1/4	9 1/2	1 1/4	37 1/2	1 1/4	V	50 1/2	2 3/4	1/8	2	47	15 1/2	3 1/4	2	191	87 1/2	242 1/2	33	10 1/2
Hurlburt B2 1/2-4	3	1 1/4	1 1/4	V	12	1 1/4	9 1/2	1 1/4	37 1/2	1 1/4	V	50 1/2	2 3/4	1/8	2	47	15 1/2	3 1/4	2	191	87 1/2	242 1/2	33	10 1/2
Hurlburt C3 1/2-4	3	1 1/4	1 1/4	V	12	1 1/4	9 1/2	1 1/4	37 1/2	1 1/4	V	50 1/2	2 3/4	1/8	2	47	15 1/2	3 1/4	2	191	87 1/2	242 1/2	33	10 1/2
Hurlburt D5-5 1/2	3	1 1/4	1 1/4	V	12	1 1/4	9 1/2	1 1/4	37 1/2	1 1/4	V	50 1/2	2 3/4	1/8	2	47	15 1/2	3 1/4	2	191	87 1/2	242 1/2	33	10 1/2
Indiana 12-1 1/2	3	1 1/4	1 1/4	V	17	1 1/4	9 1/2	1 1/4	37 1/2	1 1/4	V	50 1/2	2 3/4	1/8	2	47	15 1/2	3 1/4	2	191	87 1/2	242 1/2	33	10 1/2
Indiana 20-2	3	1 1/4	1 1/4	V	6	1 1/4	9 1/2	1 1/4	37 1/2	1 1/4	V	50 1/2	2 3/4	1/8	2	47	15 1/2	3 1/4	2	191	87 1/2	242 1/2	33	10 1/2
Indiana 25-2 1/2	3	1 1/4	1 1/4	V	6	1 1/4	9 1/2	1 1/4	37 1/2	1 1/4	V	50 1/2	2 3/4	1/8	2	47	15 1/2	3 1/4	2	191	87 1/2	242 1/2	33	10 1/2
Indiana 35-3 1/2	3	1 1/4	1 1/4	V	10	1 1/4	9 1/2	1 1/4	37 1/2	1 1/4	V	50 1/2	2 3/4	1/8	2	47	15 1/2	3 1/4	2	191	87 1/2	242 1/2	33	10 1/2
Indiana 51-5	3	1 1/4	1 1/4	V	9 1/2	1 1/4	9 1/2	1 1/4	37 1/2	1 1/4	V	50 1/2	2 3/4	1/8	2	47	15 1/2	3 1/4	2	191	87 1/2	242 1/2	33	10 1/2
Inter'l S-2000 lbs.-Sp. Tr.	3	1 1/4	1 1/4	V	6	1 1/4	9 1/2	1 1/4	37 1/2	1 1/4	V	50 1/2	2 3/4	1/8	2	47	15 1/2	3 1/4	2	191	87 1/2	242 1/2	33	10 1/2
International 21-2000 lbs.	3	1 1/4	1 1/4	V	6	1 1/4	9 1/2	1 1/4	37 1/2	1 1/4	V	50 1/2	2 3/4	1/8	2	47	15 1/2	3 1/4	2	191	87 1/2	242 1/2	33	10 1/2
International 31-3000 lbs.	3	1 1/																						

Replacement Table—Continued

NAME, MODEL AND TONNAGE	ENGINE										BRAKE LINING						FRAME									
	Piston Rings		Carburetor		Upper Hose		Lower Hose		Fan Belt		Service			Emergency			Length		Width							
	No. per Cyl.	Width	Outlet Diameter	Inlet Diameter	Vertical or Horizontal	Length	Width	Length	Width	Length	Width	Type	Length	Width	Thickness	No. of Pieces	Length	Width	Thickness	No. of Pieces	Back of Driver's Seat	Driver's Seat to Center of Rear Axle	Over All	Over All	Clearance at Lowest Point of Chassis	
MacDonald A-7	4	1 1/4	1 1/4	1 1/4	V	12	2	21	1 1/4	35	2	F	70	3	1/4	1	34	3	1/4	1	176					
MacDonald AB-7 1/2	4	1 1/4	1 1/4	1 1/4	V	12	2	21	1 1/4	35	2	F	70	3	1/4	1	34	3	1/4	1	Opt					
Mack AB-1 1/2, 2, 2 1/2-T-Ch	3	1 1/4	1 1/4	1 1/4	V	7 1/4	1 1/2	5 3/4	1 1/4	36 3/4	1 1/4	F	12 1/2	4	3/4	2	16 1/2	2 1/2	3/4	2	77			33 1/2		
Mack Dual R'd'n-1 1/2-2 1/2	3	1 1/4	1 1/4	1 1/4	V	7 1/4	1 1/2	5 3/4	1 1/4	36 3/4	1 1/4	F	12 1/2	4	3/4	2	16 1/2	2 1/2	3/4	2	Opt			33 1/2		
Mack AB-Tractor 5 Ton.	3	1 1/4	1 1/4	1 1/4	V	7 1/4	1 1/2	5 3/4	1 1/4	36 3/4	1 1/4	F	12 1/2	4	3/4	2	16 1/2	2 1/2	3/4	2	77			33 1/2		
Mack AC-3 1/2 to 7 1/2 Ton.	3	1 1/4	1 1/4	1 1/4	V	10 1/2	2	6	2				16 1/2	3	3/4	4	20 1/2	3 1/2	1 1/4	4	Opt			37 1/2		
Mack AC-Trac. 7 to 15 Ton	3	1 1/4	1 1/4	1 1/4	V	10 1/2	2	6	2				16 1/2	3	3/4	4	20 1/2	3 1/2	1 1/4	4	87			37 1/2		
Mason Road King	3	1 1/4	1 1/4	1 1/4	V	11 1/2	2	14 1/2	1 1/2			F	42 1/2	2 1/2	3/4	1	40 3/4	2 1/2	3/4	1	56 1/2	175	30	10		
Master JI-1 1/2	4	1 1/4	1 1/4	1 1/4	H	13 1/2	2	12 1/2	1 1/4	30 1/2	1 1/4	F	74 1/2	1	1	1	74 1/2	2 1/4	1 1/4	1	117 1/2			34 1/2		
Master JW-1 1/2	4	1 1/4	1 1/4	1 1/4	V	13 1/2	2	12 1/2	1 1/4	30 1/2	1 1/4	F	74 1/2	1	1	1	74 1/2	2 1/4	1 1/4	1	Opt			34 1/2		
Master JD	4	1 1/4	1 1/4	1 1/4	V	13 1/2	2	12 1/2	1 1/4	30 1/2	1 1/4	F	74 1/2	1	1	1	74 1/2	2 1/4	1 1/4	1	Opt			34 1/2		
Master M-2 1/2	4	1 1/4	1 1/4	1 1/4	V	13 1/2	2	12 1/2	1 1/4	33	1 1/4	F	74 1/2	1	1	1	74 1/2	2 1/4	1 1/4	1	117 1/2			34		
Master O 2 1/2	4	1 1/4	1 1/4	1 1/4	V	13 1/2	2	11 1/2	1 1/4	33	1 1/4	F	75 1/2	1	1	1	74 1/2	2 1/4	1 1/4	1	156 3/4			34		
Master W-2 1/2	4	1 1/4	1 1/4	1 1/4	V	13 1/2	2	12 1/2	1 1/4	31	1 1/4	F	13 1/4	3 1/2	3/4	2	13 1/2	3 1/2	3/4	2	117 1/2			34		
Master WL-2 1/2	4	1 1/4	1 1/4	1 1/4	V	13 1/2	2	12 1/2	1 1/4	31	1 1/4	F	13 1/4	3 1/2	3/4	2	13 1/2	3 1/2	3/4	2	156 3/4			34		
Master D-2 1/2	4	1 1/4	1 1/4	1 1/4	V	13 1/2	2	12 1/2	1 1/4	35	1 1/4	F	8 3/4	4 1/2	3/4	2	54 1/2	3	3/4	2	117 1/2			34		
Master DL-2 1/2	4	1 1/4	1 1/4	1 1/4	V	13 1/2	2	12 1/2	1 1/4	35	1 1/4	F	8 3/4	4 1/2	3/4	2	54 1/2	3	3/4	2	156 3/4			34		
Master DD-2 1/2	4	1 1/4	1 1/4	1 1/4	V	13 1/2	2	12 1/2	1 1/4	35	1 1/4	F	8 3/4	4 1/2	3/4	2	56 1/2	3	3/4	2	Opt			34		
Master T-6 Tractor	4	1 1/4	1 1/4	1 1/4	V	13 1/2	2	12 1/2	1 1/4	33	1 1/2	F	74 1/2	1	1	1	74 1/2	2 1/4	1 1/4	1	72 1/2			34		
Master A-3 1/2	4	1 1/4	1 1/4	1 1/4	V	13 1/2	2	15	1 1/4	35	2	F	16	3	3/4	2	16	3 3/4	3/4	2	147 1/2			36 3/4		
Master AL-3 1/2	4	1 1/4	1 1/4	1 1/4	V	13 1/2	2	15	1 1/4	35	2	F	16	3	3/4	2	16	3 3/4	3/4	2	183 3/4			36 3/4		
Master E-3 1/2	4	1 1/4	1 1/4	1 1/4	V	13 1/2	2	15	1 1/4	35	2	F	13 1/4	6	3/4	2	23	4	1 1/4	4	147 1/2			36 3/4		
Master Y-4	4	1 1/4	1 1/4	1 1/4	V	13 1/2	2	15	1 1/4	35	2	F	13 1/4	5	3/4	2	23	4	1 1/4	4	Opt			36 3/4		
Master EL-3 1/2	4	1 1/4	1 1/4	1 1/4	V	13 1/2	2	15	1 1/4	35	2	F	13 1/4	6	3/4	2	23	4	1 1/4	4	183 3/4			36 3/4		
Master B-5	4	1 1/4	1 1/4	1 1/4	V	13 1/2	2	15	1 1/4	37	2	F	13 1/4	4	3/4	2	18	4	1 1/4	2	162 1/2			39		
Master BL-5	4	1 1/4	1 1/4	1 1/4	V	13 1/2	2	15	1 1/4	37	2	F	13 1/4	4	3/4	2	18	4	1 1/4	2	186 1/2			39		
Master F-5	4	1 1/4	1 1/4	1 1/4	V	13 1/2	2	15	1 1/4	37	2	F	13 1/4	6	3/4	2	23	4	1 1/4	4	162 1/2			39		
Master FL-5	4	1 1/4	1 1/4	1 1/4	V	13 1/2	2	15	1 1/4	37	2	F	13 1/4	6	3/4	2	23	4	1 1/4	4	186 1/2			39		
Master DDT-6	4	1 1/4	1 1/4	1 1/4	V	13 1/2	2	12 1/2	1 1/4	35	1 1/4	F	8 3/4	4 1/2	3/4	2	56 1/2	3	3/4	2	Opt			34 1/2		
Master DT-6 Tractor	4	1 1/4	1 1/4	1 1/4	V	13 1/2	2	12 1/2	1 1/4	35	1 1/4	F	8 3/4	4 1/2	3/4	2	54 1/2	3	3/4	2	72 1/2			43		
Maxwell 1 1/2	3	1 1/4	1 1/4	1 1/4	V	7 1/4	1 1/2	3 1/2	1 1/4	36 1/2	1 1/4	F	31	1 1/2	3/4	4	19 1/2	1 1/4	1 1/4	1	102			36		
Menominee Hurryton-1	3	1 1/4	1 1/4	1 1/4	V	6	1 1/2	12	1 1/4	40	1 1/4	F	11	2 1/2	3/4	4	11	2 1/2	3/4	4	102 1/2			33		
Menominee H-1 1/2	3	1 1/4	1 1/4	1 1/4	V	3	1 1/4	3	1 1/2	37 3/4	2	F	13 1/2	3 1/2	3/4	2	42 1/2	2 1/2	3/4	2	122			32		
Menominee D-2	3	1 1/4	1 1/4	1 1/4	V	3	1 1/4	3	1 1/2	37 3/4	2	F	13 1/2	3 1/2	3/4	2	42 1/2	2 1/2	3/4	2	146			32		
Menominee HT-1 1/2	3	1 1/4	1 1/4	1 1/4	V	3 1/4	1 1/4	10 1/2	1 1/2	33 3/4	2	F	47 1/2	2 1/2	3/4	2	33 1/4	2 1/2	3/4	2	102 3/4			32		
Menominee RX-5	3	1 1/4	1 1/4	1 1/4	V	3 1/4	1 1/4	3	1 1/2	40 3/4	2	F	69 1/2	3 1/2	3/4	2	52	2 1/2	3/4	2	149			38		
Menominee G-3 1/2	3	1 1/4	1 1/4	1 1/4	V	3 1/4	1 1/4	3	1 1/2	37 3/4	2	F	15 1/2	3 1/2	3/4	2	4	15 1/2	3 1/2	3/4	2	149			36	
Moreland RR	3	1 1/4	1 1/4	1 1/4	H	8	1 1/2	11 1/4	1 1/2	34	1 1/2	F	49	2 1/2	3/4	2	46	2 1/2	3/4	2	108	56 1/2	208 3/4	34		
Moreland BX-1 1/2	3	1 1/4	1 1/4	1 1/4	H	8	1 1/2	11 1/4	1 1/2	34	1 1/2	F	12	3 1/4	3/4	4	12	3 1/4	3/4	4	108	56 1/2	208 3/4	34		
Moreland EX-2	3	1 1/4	1 1/4	1 1/4	H	9	1 1/2	13	1 1/2	42	1 1/2	F	12	3 1/4	3/4	4	12	3 1/4	3/4	4	132	79 1/2	216 3/4	34		
Moreland AX-3	3	1 1/4	1 1/4	1 1/4	H	9	1 1/2	13	1 1/2	42	1 1/2	F	13 1/2	3 1/2	3/4	4	13 1/2	3 1/2	3/4	4	174	101 1/2	253	38		
Moreland RX-5	3	1 1/4	1 1/4	1 1/4	H	9	1 1/2	19	2	42	2	F	15 1/2	3 1/2	3/4	4	15 1/2	3 1/2	3/4	4	192	115 1/2	271	38		
Napoleon 9-1	3	1 1/4	1 1/4	1 1/4	H	6 1/2	1 1/4	14	2 1/4	39	1	F	21	4	3/4	1	30	2 1/2	3/4	1	100	60	193	35 1/2	10	
Napoleon 11-1 1/2	3	1 1/4	1 1/4	1 1/4	H	6 1/2	1 1/4	14	2 1/4	39	1	F	21	4	3/4	1	30	2 1/2	3/4	1	100 1/4			35 1/2		
Nash 2018-1-1 1/2	4	1 1/4	1 1/4	1 1/4	V	3	1 1/2	7 1/4	1 1/4	36	1	F	49 1/2	2	3/4	2	20 1/2	2 1/2	3/4	1	104 1/2	61	193	30 1/2	9 1/2	
Nash 3018-2-2 1/2	4	1 1/4	1 1/4	1 1/4	V	3	1 1/2	7 1/4	1 1/4	36	1	F	50 3/4	2	3/4	2	20 1/2	2 1/2	3/4	1	118 1/2	65	207	31 1/2	9 1/2	
Nash 4017-2-2 1/2																										

Replacement Table—Continued

NAME, MODEL AND TONNAGE	ENGINE										BRAKE LINING								FRAME						
	Piston Rings		Carburetor		Upper Hose		Lower Hose		Fan Belt		Service				Emergency				Length		Width				
	No. per Cyl.	Width	Outlet Diameter	Inlet Diameter	Vertical or Horizontal	Length	Width	Length	Width	Length	Width	Type	Length	Width	Thickness	No. of Pieces	Length	Width	Thickness	No. of Pieces	Back of Driver's Seat	Driver's Seat to Center of Rear Axle	Over All	Over All	Clearance at Lowest Point of Chassis
Pioneer 59AA-1	3	1 1/4	1 1/4	1 1/4	V	13	2 1/2	12	2 1/2	35	1 1/2	F	14	1 1/2	1/8	4	14	1 1/2	1/8	4	102	50 1/2	181	30	
Pittsburgher 2 1/2	3	1 1/4	1 1/4	1 1/4	V	6	1 1/2	12	1 1/2	37	1 1/2	F	52	2 1/2	1/8	4	52	2 1/2	1/8	4	136	57 1/2	181	33	
Power F-2 1/2	3	1 1/4	1 1/4	1 1/4	V	8	1 1/2	12 1/2	1 1/2	39 1/2	1 1/2	F	26	2 1/2	1/8	4	26	2 1/2	1/8	4	143	57 1/2	190 1/2	32	
Rainier R31-3 1/2	3	1 1/4	1 1/4	1 1/4	V	9	1 1/2	6	1 1/2	43 1/2	1 1/2	F	11	2 1/2	1/8	4	11	2 1/2	1/8	4	86 1/2	50 1/2	181	34	11 1/2
Rainier R-29-1	3	1 1/4	1 1/4	1 1/4	V	9	1 1/2	6	1 1/2	43 1/2	1 1/2	F	11	2 1/2	1/8	4	11	2 1/2	1/8	4	96 1/2	57 1/2	190 1/2	34	10 1/2
Rainier R36-1 1/2	4	1 1/4	1 1/4	1 1/4	V	8	1 1/2	14	1 1/2	39 1/2	1 1/2	F	11 1/2	2 1/2	1/8	4	11	2 1/2	1/8	4	111	72 1/2	206 1/2	34	9 1/2
Rainier R28-2 1/2	4	1 1/4	1 1/4	1 1/4	V	9 1/2	1 1/2	14	1 1/2	42	1 1/2	F	20	2 1/2	1/8	4	20	2 1/2	1/8	4	124 1/2	80 1/2	225	33	9 1/2
Rainier R20-2 1/2	4	1 1/4	1 1/4	1 1/4	V	9 1/2	1 1/2	14	1 1/2	42	1 1/2	F	13	3 1/2	1/8	4	13	3 1/2	1/8	4	137 1/2	85 1/2	241 1/2	33	10 1/2
Rainier R25-3 1/2	4	1 1/4	1 1/4	1 1/4	V	9 1/2	1 1/2	14	1 1/2	42	1 1/2	F	15 1/2	3 1/2	1/8	4	15 1/2	3 1/2	1/8	4	157 1/2	91	263 1/2	37	8 1/2
Rainier R27-6	4	1 1/4	1 1/4	1 1/4	V	9 1/2	1 1/2	14	1 1/2	42	1 1/2	F	18	4	1/8	4	18	4	1/8	4	154 1/2	88	263 1/2	37	9 1/2
Reliance 10A-1 1/2	4	1 1/4	1 1/4	1 1/4	V	10 1/2	2 1/2	13 1/2	1 1/2	35	1 1/2	F	17	2 1/2	1/8	4	17	2 1/2	1/8	4	122			34	
Reliance 20B-2 1/2	4	1 1/4	1 1/4	1 1/4	V	10 1/2	2 1/2	13 1/2	1 1/2	35	1 1/2	F	17	2 1/2	1/8	4	17	2 1/2	1/8	4	127			32	
Reo F-2500 lbs.	3	1 1/4	1 1/4	1 1/4	V	5 1/2	1 1/2	1	1 1/2	39	1 1/2	F	45 1/2	3 1/2	1/8	1	40	3 1/2	1/8	1	81 1/2	55 1/2	171	30	10 1/2
Republic 10-1-10E-1	3	1 1/4	1 1/4	1 1/4	V	12 1/2	2 1/2	6	2 1/2	40	1 1/2	F	21 1/2	2 1/2	1/8	4	19 1/2	2 1/2	1/8	4	118			34	
Republic 11X-1 1/2	3	1 1/4	1 1/4	1 1/4	V	12 1/2	2 1/2	6	2 1/2	40	1 1/2	F	25 1/2	2 1/2	1/8	4	24	2 1/2	1/8	4	121			34	
Republic 19-2 1/2	3	1 1/4	1 1/4	1 1/4	V	8	1 1/2	11 1/2	1 1/2	32	1 1/2	F	24	2 1/2	1/8	4	24	2 1/2	1/8	4	146			37	
Republic 20-3 1/2	3	1 1/4	1 1/4	1 1/4	V	7 1/2	1 1/2	5 1/2	1 1/2	36	1 1/2	F	25 1/2	2 1/2	1/8	2	30	2 1/2	1/8	4	146			37	
Republic Rapid Transit-3 1/2	3	1 1/4	1 1/4	1 1/4	V	12	2 1/2	18 1/2	2 1/2	31 1/2	1 1/2	F	19	2 1/2	1/8	4	18	2 1/2	1/8	4	95			31	
Reynolds 23A-2	3	1 1/4	1 1/4	1 1/4	V	10 1/2	1 1/2	10 1/2	1 1/2	35	1 1/2	F	24	2 1/2	1/8	4	24	2 1/2	1/8	4	136			33	
Reynolds 23B-3	3	1 1/4	1 1/4	1 1/4	V	10 1/2	1 1/2	10 1/2	1 1/2	35	1 1/2	F	24	2 1/2	1/8	4	24	2 1/2	1/8	4	156			33	
Reynolds 23C-25-pas. Bus.	3	1 1/4	1 1/4	1 1/4	V	10 1/2	1 1/2	10 1/2	1 1/2	35	1 1/2	Opt	27	2 1/2	1/8	2	27	2 1/2	1/8	2	220	72	192 1/2	53 1/2	
Rowe CW-1 1/2	3	1 1/4	1 1/4	1 1/4	V	10 1/2	1 1/2	10 1/2	1 1/2	32 1/2	1 1/2	F	19	2 1/2	1/8	4	19	2 1/2	1/8	4	113			33	11
Rowe CDW-2	3	1 1/4	1 1/4	1 1/4	V	10 1/2	1 1/2	10 1/2	1 1/2	32 1/2	1 1/2	F	24	2 1/2	1/8	4	24	2 1/2	1/8	4	123	79	202 1/2	33	10 1/2
Rowe CDW-2 1/2	3	1 1/4	1 1/4	1 1/4	V	20	1 1/2	15 1/2	1 1/2	32 1/2	1 1/2	F	24	2 1/2	1/8	4	24	2 1/2	1/8	4	123	103 1/2	224	33	9 1/2
Rowe GSW-3	3	1 1/4	1 1/4	1 1/4	V	20	1 1/2	15 1/2	1 1/2	36	1 1/2	F	24	2 1/2	1/8	4	24	2 1/2	1/8	4	140	96	230 1/2	36	9
Rowe HW-4	3	1 1/4	1 1/4	1 1/4	V	20	1 1/2	15 1/2	1 1/2	36	1 1/2	F	56 1/2	3 1/2	1/8	2	56 1/2	3 1/2	1/8	2	146	107	237 1/2	38 1/2	10 1/2
Rowe FW-5	3	1 1/4	1 1/4	1 1/4	V	20	1 1/2	15 1/2	1 1/2	36	1 1/2	F	68	3 1/2	1/8	2	68	3 1/2	1/8	2	152	96 1/2	233 1/2	33	12 1/2
Rowe GPW-3	3	1 1/4	1 1/4	1 1/4	V	10	1 1/2	15 1/2	1 1/2	36	1 1/2	F	43 1/2	2 1/2	1/8	2	43 1/2	2 1/2	1/8	2	128	97 1/2	170	38 1/2	9 1/2
Ruggles 15-3 1/2	3	1 1/4	1 1/4	1 1/4	V	12 1/2	2 1/2	20	2 1/2	34 1/2	1 1/2	F	48	2 1/2	1/8	2	48	2 1/2	1/8	2	96 1/2	55 1/2	186 1/2	34	11 1/2
Ruggles 20R-1 1/2	3	1 1/4	1 1/4	1 1/4	V	7 1/2	1 1/2	13 1/2	1 1/2	35	1 1/2	F	48	2 1/2	1/8	2	46 1/2	2 1/2	1/8	2	104 1/2	65	194 1/2	34	11 1/2
Ruggles 20AR-1 1/2	3	1 1/4	1 1/4	1 1/4	V	7 1/2	1 1/2	13 1/2	1 1/2	35	1 1/2	F	47 1/2	2 1/2	1/8	2	46 1/2	2 1/2	1/8	2	134 1/2	75 1/2	224	34	8 1/2
Ruggles 40-2	3	1 1/4	1 1/4	1 1/4	V	7 1/2	1 1/2	13 1/2	1 1/2	35	1 1/2	F	58	2 1/2	1/8	2	44	2 1/2	1/8	2	134 1/2	75 1/2	224	34	9 1/2
Ruggles 40H-2 1/2	3	1 1/4	1 1/4	1 1/4	V	7 1/2	1 1/2	13 1/2	1 1/2	35	1 1/2	F	58	2 1/2	1/8	2	44	2 1/2	1/8	2	134 1/2	75 1/2	224	34	9 1/2
Rumely A-1 1/2	4	1 1/4	1 1/4	1 1/4	V	10 1/2	1 1/2	10 1/2	1 1/2	37	1 1/2	F	18	2 1/2	1/8	4	18	2 1/2	1/8	4	122	72	213	32	11 1/2
Sanford W15-1 1/2	3	1 1/4	1 1/4	1 1/4	V	9	1 1/2	11	1 1/2	40	1 1/2	F	22 1/2	2 1/2	1/8	4	22 1/2	2 1/2	1/8	4	120	71 1/2	205 1/2	32	11 1/2
Sanford 25-2 1/2	3	1 1/4	1 1/4	1 1/4	V	8	1 1/2	11	1 1/2	32	1 1/2	F	22 1/2	2 1/2	1/8	4	22 1/2	2 1/2	1/8	4	144	109 1/2	238	35	9 1/2
Sanford 35-3 1/2	3	1 1/4	1 1/4	1 1/4	V	9	1 1/2	11	1 1/2	32	1 1/2	F	55 1/2	2 1/2	1/8	2	55 1/2	2 1/2	1/8	2	144	97 1/2	244	35	8 1/2
Sanford 50-5	3	1 1/4	1 1/4	1 1/4	V	9	1 1/2	11	1 1/2	32	1 1/2	F	65	2 1/2	1/8	2	65	2 1/2	1/8	2	144	97 1/2	244	35	10 1/2
Schacht F-2	4	1 1/4	1 1/4	1 1/4	V	11	2	14	1 1/2	37 1/2	1 1/2	F	8 1/2	3 1/2	1/8	4	13 1/2	3 1/2	1/8	4	140			35 1/2	
Schacht F-3	4	1 1/4	1 1/4	1 1/4	V	11	2	14	1 1/2	37 1/2	1 1/2	F	8 1/2	3 1/2	1/8	4	13 1/2	3 1/2	1/8	4	140			35 1/2	
Schacht E-4	4	1 1/4	1 1/4	1 1/4	V	10 1/2	2	13 1/2	1 1/2	39 1/2	1 1/2	V	8 1/2	3 1/2	1/8	4	15	4	1/8	4	152			35 1/2	
Schacht E-5	4	1 1/4	1 1/4	1 1/4	V	10 1/2	2	13 1/2	1 1/2	39 1/2	1 1/2	V	8 1/2	3 1/2	1/8	4	15	4	1/8	4	152			35 1/2	
Schacht E-7	4	1 1/4	1 1/4	1 1/4	V	10 1/2	2	13 1/2	1 1/2	39 1/2	1 1/2	V	8 1/2	3 1/2	1/8	4	15	4	1/8	4	152			35 1/2	
Schwartz A-1	3	1 1/4	1 1/4	1 1/4	V																				

Replacement Table—Continued

NAME, MODEL AND TONNAGE	ENGINE										BRAKE LINING				FRAME										
	Piston Rings		Carburetor		Upper Hose		Lower Hose		Fan Belt		Service		Emergency		Length		Width								
	No. per Cyl.	Width	Outlet Diameter	Inlet Diameter	Vertical or Horizontal	Length	Width	Length	Width	Length	Width	Type	Length	Width	Thickness	No. of Pieces	Length	Width	Thickness	No. of Pieces	Back of Driver's Seat	Driver's Seat to Center of Rear Axle	Over All	Over All	Clearance at Lowest Point of Chassis
Titan 5.....	4	3	1 1/2	1 1/2	V	7	1 1/2	11 1/2	1 1/2	33	1 1/2	F	15	3	1 1/2	4	14	6	1 1/2	2	144	74 1/2	224	34	11 1/2
Tower J-1 1/2.....	3	3	1 1/2	1 1/2	V	7	1 1/2	11 1/2	1 1/2	33	1 1/2	F	13 1/2	3	1 1/2	4	11 1/2	3 1/2	1 1/2	4	135 1/2	75 1/2	230	32 1/2	10 1/2
Tower H-2 1/2.....	3	3	1 1/2	1 1/2	V	7	1 1/2	11 1/2	1 1/2	33	1 1/2	F	13 1/2	3	1 1/2	4	11 1/2	3 1/2	1 1/2	4	138 1/2	75 1/2	230	32 1/2	10 1/2
Tower G-3 1/2.....	3	3	1 1/2	1 1/2	V	7	1 1/2	11 1/2	1 1/2	36	1 1/2	F	15 1/2	3	1 1/2	4	15 1/2	3 1/2	1 1/2	4	152 1/2	90 1/2	248	37	9 1/2
Traffic C-4000.....	3	3	1 1/2	1 1/2	V	7	1 1/2	11 1/2	1 1/2	41 1/2	1 1/2	F	43 1/2	3	1 1/2	4	43 1/2	3 1/2	1 1/2	4	120 1/2	67 1/2	213 1/2	42	10 1/2
Traffic 6000.....	3	3	1 1/2	1 1/2	V	7	1 1/2	11 1/2	1 1/2	41 1/2	1 1/2	F	52	3	1 1/2	4	47	2 1/2	1 1/2	4	120 1/2	69 1/2	213 1/2	34	11 1/2
Traffic Speedboy.....	3	3	1 1/2	1 1/2	V	7	1 1/2	11 1/2	1 1/2	41 1/2	1 1/2	F	43 1/2	3	1 1/2	4	38	1 1/2	1 1/2	4	86	53 1/2	174	34	11 1/2
Transport 15-1.....	3	3	1 1/2	1 1/2	V	7	1 1/2	11 1/2	1 1/2	40 1/2	1 1/2	F	48	3	1 1/2	4	46 1/2	2 1/2	1 1/2	4	98 1/2			34	
Transport 25-1 1/2.....	3	3	1 1/2	1 1/2	V	7	1 1/2	11 1/2	1 1/2	36 1/2	1 1/2	F	48 1/2	3	1 1/2	4	46 1/2	1 1/2	1 1/2	4	100 1/2			34	
Transport 35-2.....	3	3	1 1/2	1 1/2	V	7	1 1/2	11 1/2	1 1/2	36 1/2	1 1/2	F	48 1/2	3	1 1/2	4	46 1/2	1 1/2	1 1/2	4	116 1/2			34	
Transport 60-3 1/2.....	4	4	1 1/2	1 1/2	V	7	1 1/2	11 1/2	1 1/2	40 1/2	1 1/2	F	11	3	1 1/2	4	46 1/2	2 1/2	1 1/2	4	123 1/2			34	
Transport 75-5.....	4	4	1 1/2	1 1/2	V	7	1 1/2	11 1/2	1 1/2	35 1/2	1 1/2	F	11 1/2	3	1 1/2	4	58	2 1/2	1 1/2	4	150 1/2			36 1/2	
Transport 55-3.....	3	3	1 1/2	1 1/2	V	9	1 1/2	16	1 1/2	31 1/2	1 1/2	F	10 1/2	3	1 1/2	4	48 1/2	2 1/2	1 1/2	4	123 1/2			34	
Traylor B.....	4	4	1 1/2	1 1/2	V					38	1	F	50	2	2	2	50	2	2	2	117	75	204 3/4	34	10
Traylor C.....	4	4	1 1/2	1 1/2	V					36	2	F	50	2	2	2	50	2	2	2	122	73 1/2	230	34	10 1/2
Traylor D.....	4	4	1 1/2	1 1/2	V					36	2	F	56 1/2	2 1/2	2	2	56 1/2	2 1/2	2	2	142	76	241 1/4	34	9
Traylor F.....	4	4	1 1/2	1 1/2	V					37	2	F	59	2 1/2	2	2	59	2 1/2	2	2	165	92 1/2	273 1/2	35	11
Triangle AA-1.....	3	3	1	1	H	17	2	17		34	1	F	22 1/2	1 1/4	1	4	48	2 1/2	2	2	94	53	177	35	10
Triangle A-1 1/2.....	3	3	1	1 1/4	V	14	1 1/4	14 1/2	1 1/4	39 1/4	1 1/4	F	7	4	4	2	49	2	2	2	126	77 1/2	225	34	12
Triangle B-2 1/2.....	3	3	1	1 1/4	V	9	1 1/4	18	1 1/4	39 1/4	1 1/4	F	7	4	4	2	52	3	2	2	132	84 1/2	217 1/2	34	9
Triangle C-2.....	3	3	1	1	V	14	1	14 1/2	1	39 1/4	1 1/4	F	7	4	4	2	52	3	2	2	129	81	219 1/4	34	12
Triumph HB-2 1/2.....	4	4	1 1/4	1 1/4	V	9	1 1/4	17	1 1/4	32 1/2	2	F	46	2 1/2	2	2	32	2 1/2	2	2	120			34 1/2	
Triumph HC-2.....	4	4	1 1/4	1 1/4	V	9	1 1/4	17	1 1/4	32 1/2	2	F	46	2 1/2	2	2	32	2 1/2	2	2	120			34 1/2	
Ultimate A-2.....	4	4	1 1/4	1 1/4	V	11	2	8	1 1/4	34	2	F	20	2 1/4	2	2	45	2	2	2	126			32 1/2	
Ultimate AJ2.....	4	4	1 1/4	1 1/4	V	11	2	8	1 1/4	34	2	F	20	2 1/4	2	2	45	2	2	2	126			32 1/2	
Ultimate AJL-2.....	4	4	1 1/4	1 1/4	V	11	2	8	1 1/4	34	2	F	20	2 1/4	2	2	45	2	2	2	150			32 1/2	
Ultimate B-3.....	4	4	1 1/4	1 1/4	V	11	2	8	1 1/4	34	2	F	51	2 1/2	2	2	51	2 1/4	2	2	144			32 1/2	
Ultimate BL3.....	4	4	1 1/4	1 1/4	V	11	2	8	1 1/4	34	2	F	51	2 1/2	2	2	51	2 1/4	2	2	192			32 1/2	
Ultimate D-5.....	4	4	1 1/4	1 1/4	V	11	2	8	1 1/4	34	2	F	51	2 1/2	2	2	51	2 1/4	2	2	180			37 1/2	
Union FW-2 1/2.....	3	3	1 1/4	1 1/4	V	20	1 1/4	19 1/2	1 1/4	37 3/4	2	F	26	4 1/2	1	1	52	3	1	1	133 1/2	77 3/4	224	32	11 1/2
Union H-4.....	3	3	1 1/4	1 1/4	V	20	1 1/4	19 1/2	1 1/4	37 3/4	2	F	56 1/2	3 1/2	1	1	32	4 1/2	1	1	157 1/2			34	
Union HW-4.....	3	3	1 1/4	1 1/4	V	20	1 1/4	19 1/2	1 1/4	37 3/4	2	F	26	4 1/2	1	1	24	4	1	2	157 1/2	98	264	34	13 1/2
United H Spec.....	4	4	1	1	V	16	2	19	2	32	1 1/2	F	49	2 1/2	2	2	49	2 1/2	2	2					
United 30, 35, 50.....	4	4	1	1	V	7	1	13	1	34	1 1/2	F	49	2 1/2	2	2	49	2 1/2	2	2					
United C.....	4	4	1	1	V	7	2 1/2	7	2 1/2	37 1/2	2	F	62	3	1	1	58	2 1/2	2	2					
United 1 1/2.....	4	4	1	1	V	15	2 1/2	16	1 1/2	37 1/2	2	F	48	3	1	1	48	1 1/2	1	1	120			33	
United 2 1/2.....	4	4	1	1	V	7	2 1/2	12	1 1/2	37 1/2	2	F	49	3	1	1	49	1 1/2	1	1	Opt			33	
United 3 1/2.....	4	4	1	1	V	7	2 1/2	7	1 1/2	37 1/2	2	F	60 1/2	2 1/2	1	1	58	2 1/2	1	1	Opt			34	
U.S.U.-1 1/2.....	4	4	1	1	V	11 1/2	2	11 1/2	1 1/2	33	1 1/4	F	50 1/2	2 1/2	2	2	20	1 1/2	2	2	108	70	195	32	9 3/4
U.S.N.-1 1/2.....	3	M	1	1	V	11 1/2	2	9	1 1/2	37	1 1/4	F	50 1/2	2 1/2	2	2	46 1/2	1 1/2	2	2	120	82	211	34	11
U.S.N.W.-23-1 1/2-2.....	4	4	1	1	V	10 1/2	1 1/2	11 1/2	1 1/2	33	1 1/4	F	21	2 1/4	4	4	21	2 1/4	4	4	120	82	211	34	11
U.S.R.-2 1/2-3.....	3	3	1 1/4	1 1/4	V	10	1 1/4	10	1 1/4	35	1 1/4	F	21	2 1/4	4	4	21	2 1/4	4	4	144	94	241	34	9 3/4
U.S.S.-3 1/2-4.....	3	3	1 1/4	1 1/4	V	9	1 1/4	8	1 1/4	37	1 1/4	F	50	2 1/2	2	2	50	2 1/2	2	2	156	104	258	36	9
U.S.T.-5-7.....	4	4	1 1/2	1 1/2	V	15	2	13	1 1/2	38 3/4	2	F	62	3	4	4	33	4	1	1	168	103	278	36	10 1/2
U.S.S.Spec. 4-5.....	3	3	1 1/4	1 1/4	V	9	1 1/2	8	1 1/2	37	1 1/4	F	21	4	4	4	21	3	4	4	156			36	
Velie 46-1 1/2.....	3	M	1	1	V	9	2	12	1 1/2	41 1/2	2	V	54 1/2	2 1/2	2	2	52 1/2	2 1/2	2	2	120			31	
Velie 53-2 1/2.....	3	3	1 1/4	1 1/4	V	5 1/2	1 1/2	12 1/2	1 1/2	40 1/2	2	F	54 1/2	2 1/2	2	2	52 1/2	2 1/2	2	2	120			31	
Vim 50-1 1/2-3/4.....	3	3	1	1	V					33 3/4		F	48	2 1/2	2	2	46 1/2	2 1/2	2	2					
Walker M2.....	3	3	1	1	V							F	43	2 1/											

KEY OF ABBREVIATIONS

Note: Numerals on This Page Correspond With Numerals at Head of Specification Columns on Page Following. In All Specifications—O, Own; Op or Opt, Optional

Engine:

Beav—Beaver
Buda
Cont—Continental
GBS—Golden, Belknap &
Gr-B—Gray-Beal [Swartz
Her—Hercules
Hin—Hinkley
1 H-Sp—Herschell-Spillman
LeR—Le Roi
Lib—Liberty
LMF—Light Mfg. & Fdy.
Lyco—Lycoming
Mid—Midwest
Sup—Supreme
Wau—Waukesha
Wei—Weidely
Wis—Wisconsin

Valve Arrangement:

2 H—Overhead
L—ELL-Head
S—Sleeve
T—TEE-Head

Radiator (Make):

3 BW—B & W
Brm—Brenem
Bus—Bush
Can—Candler
Chic—Chicago
Eag—Eagle
EM—English-Mersick
Eur—Eureka
Fed—Fedders
Flex—Flexo
GO—G. & O.
Har—Harrison
Hoo—Hooven
Idl—Ideal
Jam—Jamestown
Kue—Kuenz
Liv—Livingston
Lng—Long
McC—McCord
May—Mayo
Mod—Modine
Per—Perfex
R-T—Rome-Turney
SJ—Shotwell Johnson
Spar—Sparton
Spec—Special
Spli—Splitex
Stn—Standard
Whe—Wheeler

Lubrication:

4 FS—Force and Splash
F—Force Feed
S—Splash

Carburetor:

5 Bent—Bennett
Cart—Carter
Eag—Eagle
Ens—Ensign
Hol—Holly
John—Johnson
King—Kingston
Mar—Marvel
Mas—Master
Mill—Miller
Rayf—Rayfield
Scoe—Scoe
Strm—Stromberg
Sheb—Schebler
Stew—Stewart
Till—Tillotson
Zen—Zenith

Fuel Feed:

6 G—Gravity
P—Pressure
V—Vacuum

Governor:

7 Con—Continental
Dup—Duplex
Han—Handy
Her—Hercules
Hin—Hinkley
McC—McCanna
Mon—Monarch
Phar—Pharo
Pier—Pierce
Sim—Simplex
Wau—Waukesha

Ignition System:

8 Amr—American Swiss
Apo—Apollo
AtK—Atwater Kent
AuL—Auto-Lite
Ber—Berling
Bos—Bosch
Con—Connecticut
Del—Delco
Eis—Eisemann
Kin—Kingston
KW—K. W. Ignition Co.
Lor—Lorraine
NE—North East
POL—Prest-O-Lite
Rm—Remy
RBo—Robert Bosch
Sim—Simms
Spl—Splitdorf
Tea—Teagle
Wag—Wagner
Wes—Westinghouse

Engine Starter:

9 AC—Allis-Chalmers
AK—Atwater Kent
AuL—Auto-Lite
Bj—Bijur
Bos—Bosch
Del—Delco
Dy—Dyneto
GD—Gray & Davis
LN—Leece-Neville
NE—North East
Rm—Remy
Sim—Simms
USL—U. S. L.
Wes—Westinghouse
Wg—Wagner

Clutch (Make):

10 B.B—Borg & Beck
B-Li—Brown-Lipe
Covt—Covert
Det—Detlaff
DG—Detroit Gear & Mach.
Dod—Dodge
Full—Fuller
Hart—Hartford
Hoos—Hoosier
HS—Hele-Shaw
M-E—Merchant & Evans
Mun—Muncie
T-D—Twin Disc
W-Gr—Warner Gear

Gearset:

11 B-Li—Brown-Lipe
Cott—Cotta
Covt—Covert
Det—Detroit
Dod—Dodge
Dun—Dundore
Durs—Durstun

Full—Fuller

G-Le—Grant Lees
MM—Mechanics Mach. Co.
Mun—Muncie
W-C—Warner Corporation
W-Gr—Warner Gear

Location of Gearset:

12 A—Amidships
J—Unit with jackshaft
R—Rear
U—Unit with engine

Universal:

13 Acm—Acme
Arv—Arvac
Bld—Blood-Brothers
Det—Detroit
Hart—Hartford
KB—Kinsler-Bennett
MM—Mechanics
M-E—Merchant & Evans
Nor—Norwalk
Pet—Cleveland Universal
Pick—Pick
Sned—Snead
Spic—Spicer
Ster—Sterling
Ther—Thermoid
UM—Universal Machine
UP—Universal Products
Var—Varied

Springs:

14 Am—Am. Auto Parts
Arm—Armstrong
Cham—Champion
Del—Delany
Det—Detroit
GC—Garden City
Har—Harvey
IC—Iron City
Kal—Kalamazoo
Lah—Laher
Lig—Liggett
Mar—Maremont
Math—Mather
Mer—Merrill
Nat—National
Pen—Penn
Per—Perfection
P.S.—Point Spring Co.
Row—Rowland
Shel—Sheldon
SP—Spring Perch
Stan—Stan-Par
SS—Standard Steel
Ster—Sterling
Tut—Tuthill
US—United States
Vul—Jenkins Vulcan

Front Axle

15 Col—Columbia
Cont—Continental
Dod—Dodge
Fli—Flint
Sals—Salisbury
Sav—Savage
Shel—Sheldon
Shul—Shuler
Stan—Stan-Par
Tim—Timken
Torb—Torbensen
Vul—Vulcan

Final Drive:

16 B—Bevel Gear
C—Chain
I—Internal Gear
P—Spur
R—Double Reduction
S—Spiral Bevel
W—Worm

Rear Axle (Make):

17 Col—Columbia
Clark
Dun—Dunkirk
Eat—Eaton
Fli—Flint
Huck—Huck
IrM—Iron Mt.
LM—L M Axle
Russ—Russel
Sals—Salisbury
Shel—Sheldon
Stn—Standard Parts
Thom—Thomson
Tim—Timken
Torb—Torbensen
Vul—Vulcan
Walk—Walker
Wis—Wisconsin

Rear Axle (Type):

18 F—Floating
D—Dead
½—Semi-Floating
¾—¾-Floating

Steering Gear:

19 CAS—C. A. S. Products Co.
Dit—Ditwiler
Dod—Dodge
Gem—Gemmer
Jac—Jacox
Lav—Lavine
M-P—Muncie Products
Ros—Ross
Sag—Saginaw Products Co.
Woh—Wohlrab

Wheels:

20 Arc—Archibald
AuW—Auto Wheel
Bim—Bimel
Bud—Budd
Cla—Clark
C&M—Crane & McMahon
Day—Dayton
Det—Detroit
Dis—Disteel
E&O—Eberly & Oris
Hay—Hayes
Hoo—Hoopes Brothers
Imp—Imperial
Ind—Indestructible
Jon—Jones
Kel—Kelsey
MM—Michigan Malleable
Iron Co.
Mot—Motor Wheel
Mun—Muncie Wheel
Mut—Mutual
Nor—Northern
Pru—Prudden
Roy—Royer
Sch—Schwartz
Smi—Smith
Sta—Stanwell
StM—St. Mary
Stn—Standard
Wal—Walker
Way—Wayne
W-L—Waterhouse & Lester

Rim Equipment:

21 Bak—Baker
Cle—Cleveland
Det—Detroit
Fir—Firestone
Gdy—Goodyear
Hay—Hayes
Jac—Jackson
Jax—Jaxon
Kel—Kelsey
Mil—Miller

Commercial Car Specifications—Corrected Monthly

The Specifications, Chassis Prices, Etc., Are Corrected Each Month From Data Supplied Direct by the Makers. Gasoline Tractor-Trucks Will be Found at the End of Gasoline Commercial Cars

See Preceding Table for Replacement Data. Truck Frame Dimensions Are Included in Same Table

(Where prices are not given it is because we have been unable to get them from authoritative sources)

* This symbol in the wheelbase column indicates that more than one wheelbase is furnished

TRADE NAME AND MODEL	Chassis Price	ENGINE DETAILS										GEARSET			FRONT AXLE and Model Number	REAR AXLE		Steering Gear (Make)	TIRES, WHEELS, RIMS		Chassis Weight (Stripped)									
		Make and Model Number 4 cylinder unless otherwise noted.	Bore and Stroke	N.A.C.C. Horsepower	Valve Arrangement	Radiator (Make)	Lubrication	Carburetor	Fuel Feed	Governor (Make)	Ignition System	Engine Starter	Clutch (Make)	GEARSET		Make and Model Number	Type		Total Gear Reduction in High	Total Gear Reduction in Low		Front	Rear	Wheels (Make)	Rim Equipment					
														Universal (Make)												Springs (Make)	Final Drive	Make and Model Number	Location	Speeds
1000 Pounds																														
Chevrolet, Sup. LD.....	510	Own	34x4	21.7	18.2 L	Har	FS	Zen	G	.....	Rm	Rm	Own	.....	U	3	Own	SS	.....	3.77	12.52 M-P	30x3 1/2	30x3 1/2	Hay	Jax	1390 103	
Dort.....	685	Own	34x4	19.6 L	18.2 L	Fed	FS	Cart	V	.....	Con Bos	Bos	Own	.....	U	3	MM	Lig	.....	4.66	15.13 Sag	31x4*	31x4*	Imp	Jac	2015 106	
Overland.....	425	Own	34x4	18.2 L	18.2 L	Own	FS	Till	G	.....	AuL	AuL	B.B.	.....	U	3	Own	Own	.....	4.5	17.68	30x3 1/2	30x3 1/2	Hay	.....	1462 100
1500 Pounds																														
American LaFrance 1R.....	.....	Own	41x5	28.9 L	18.2 L	Bus	FS	Strm	G	.....	Del	Del	Own	.....	A	3	Own	Mer	.....	4.7	25.3	33x5*	33x5*	Hoo	.....	139 1/2
Buick.....	575	Own	34x4	21.7 H	18.2 L	Har	FS	Mar	V	.....	Del	Del	Own	.....	U	3	Own	Opt	.....	4.66	13.05 Juc	31x4*	31x4*	Jac	.....	2030 109
Chevrolet G.....	1250	Cont N	34x4	21.7 H	18.2 L	Har	FS	Zen	V	.....	Eis	Bj	DG	.....	U	3	Own	SS	.....	5.42	18.33	32x4*	32x4*	Hay	.....	1825 120
Corbett S Speed Truck.....	1250	Cont N	34x4	21.7 H	18.2 L	Har	FS	Zen	V	.....	Eis	Bj	DG	.....	U	3	Own	SS	.....	5.42	18.33	32x4*	32x4*	Hay	.....	1825 120
Dodge Brothers.....	1250	Cont N	34x4	21.7 H	18.2 L	Har	FS	Zen	V	.....	Eis	Bj	DG	.....	U	3	Own	SS	.....	5.42	18.33	32x4*	32x4*	Hay	.....	1825 120
Dodge A2.....	1095	Cont N	34x4	21.7 H	18.2 L	Har	FS	Zen	V	.....	Eis	Bj	DG	.....	U	3	Own	SS	.....	5.42	18.33	32x4*	32x4*	Hay	.....	1825 120
Perfection A.....	1095	Cont N	34x4	21.7 H	18.2 L	Har	FS	Zen	V	.....	Eis	Bj	DG	.....	U	3	Own	SS	.....	5.42	18.33	32x4*	32x4*	Hay	.....	1825 120
Rainier R-31.....	1070	Cont N	34x4	21.7 H	18.2 L	Har	FS	Zen	V	.....	Eis	Bj	DG	.....	U	3	Own	SS	.....	5.42	18.33	32x4*	32x4*	Hay	.....	1825 120
Ruggles 12.....	795	Cont N	34x4	21.7 H	18.2 L	Har	FS	Zen	V	.....	Eis	Bj	DG	.....	U	3	Own	SS	.....	5.42	18.33	32x4*	32x4*	Hay	.....	1825 120
Service 12.....	1095	Cont N	34x4	21.7 H	18.2 L	Har	FS	Zen	V	.....	Eis	Bj	DG	.....	U	3	Own	SS	.....	5.42	18.33	32x4*	32x4*	Hay	.....	1825 120
Stoughton C.....	1095	Cont N	34x4	21.7 H	18.2 L	Har	FS	Zen	V	.....	Eis	Bj	DG	.....	U	3	Own	SS	.....	5.42	18.33	32x4*	32x4*	Hay	.....	1825 120
Vim 50.....	995	Own	44x5	28.9 L	18.2 L	Bus	FS	Strm	G	.....	Del	Del	Own	.....	A	3	Own	Mer	.....	4.7	25.3	33x5*	33x5*	Hoo	.....	139 1/2
White 15.....	2400	Own	34x4	21.7 H	18.2 L	Har	FS	Zen	V	.....	Eis	Bj	DG	.....	U	3	Own	SS	.....	5.42	18.33	32x4*	32x4*	Hay	.....	1825 120
Yellow Cab. M-22-1/2.....	1590	Cont V-4	34x4	21.7 H	18.2 L	Har	FS	Zen	V	.....	Eis	Bj	DG	.....	U	3	Own	SS	.....	5.42	18.33	32x4*	32x4*	Hay	.....	1825 120
1 Ton																														
Acme 20.....	1495	Cont N	34x4	21.7 H	18.2 L	Har	FS	Zen	V	.....	Eis	Bj	DG	.....	U	3	Own	SS	.....	5.42	18.33	32x4*	32x4*	Hay	.....	1825 120
Atlas 22.....	2200	Own	34x4	21.7 H	18.2 L	Har	FS	Zen	V	.....	Eis	Bj	DG	.....	U	3	Own	SS	.....	5.42	18.33	32x4*	32x4*	Hay	.....	1825 120
Autocar F.....	2200	Own	34x4	21.7 H	18.2 L	Har	FS	Zen	V	.....	Eis	Bj	DG	.....	U	3	Own	SS	.....	5.42	18.33	32x4*	32x4*	Hay	.....	1825 120
Autocar G.....	2200	Own	34x4	21.7 H	18.2 L	Har	FS	Zen	V	.....	Eis	Bj	DG	.....	U	3	Own	SS	.....	5.42	18.33	32x4*	32x4*	Hay	.....	1825 120
Avery.....	1495	Own	34x4	21.7 H	18.2 L	Har	FS	Zen	V	.....	Eis	Bj	DG	.....	U	3	Own	SS	.....	5.42	18.33	32x4*	32x4*	Hay	.....	1825 120
Bell M.....	1495	Own	34x4	21.7 H	18.2 L	Har	FS	Zen	V	.....	Eis	Bj	DG	.....	U	3	Own	SS	.....	5.42	18.33	32x4*	32x4*	Hay	.....	1825 120
Belmont B.....	1495	Own	34x4	21.7 H	18.2 L	Har	FS	Zen	V	.....	Eis	Bj	DG	.....	U	3	Own	SS	.....	5.42	18.33	32x4*	32x4*	Hay	.....	1825 120
Bessemer G.....	1450	Own	34x4	21.7 H	18.2 L	Har	FS	Zen	V	.....	Eis	Bj	DG	.....	U	3	Own	SS	.....	5.42	18.33	32x4*	32x4*	Hay	.....	1825 120
Bethlehem K.N.....	1385	Own	34x4	21.7 H	18.2 L	Har	FS	Zen	V	.....	Eis	Bj	DG	.....	U	3	Own	SS	.....	5.42	18.33	32x4*	32x4*	Hay	.....	1825 120
Beitz.....	1850	Own	34x4	21.7 H	18.2 L	Har	FS	Zen	V	.....	Eis	Bj	DG	.....	U	3	Own	SS	.....	5.42	18.33	32x4*	32x4*	Hay	.....	1825 120
Brookway E.....	1785	Own	34x4	21.7 H	18.2 L	Har	FS	Zen	V	.....	Eis	Bj	DG	.....	U	3	Own	SS	.....	5.42	18.33	32x4*	32x4*	Hay	.....	1825 120
Casco Model A.....	1850	Own	34x4	21.7 H	18.2 L	Har	FS	Zen	V	.....	Eis	Bj	DG	.....	U	3	Own	SS	.....	5.42	18.33	32x4*	32x4*	Hay	.....	1825 120
Chevrolet.....	1850	Own	34x4	21.7 H	18.2 L	Har	FS	Zen	V	.....	Eis	Bj	DG	.....	U	3	Own	SS	.....	5.42	18.33	32x4*	32x4*	Hay	.....	1825 120
Corbett E-22.....	1495	Own	34x4	21.7 H	18.2 L	Har	FS	Zen	V	.....	Eis	Bj	DG	.....	U	3	Own	SS	.....	5.42	18.33	32x4*	32x4*	Hay	.....	1825 120
Day-Elder N.....	1600	Own	34x4	21.7 H	18.2 L	Har	FS	Zen	V	.....	Eis	Bj	DG	.....	U	3	Own	SS	.....	5.42	18.33	32x4*	32x4*	Hay	.....	1825 120
Dearborn E (Speed).....	1600	Own	34x4	21.7 H	18.2 L	Har	FS	Zen	V	.....	Eis	Bj	DG	.....	U	3	Own	SS	.....	5.42	18.33	32x4*	32x4*	Hay	.....	1825 120
Dickson E.....	1695	Own	34x4	21.7 H	18.2 L	Har	FS	Zen	V	.....	Eis	Bj	DG	.....	U	3	Own	SS	.....	5.42	18.33	32x4*	32x4*	Hay	.....	1825 120
D-Olt A-1.....	2490	Own	34x4	21.7 H	18.2 L	Har	FS	Zen	V	.....	Eis	Bj	DG	.....	U	3	Own	SS	.....	5.42	18.33	32x4*	32x4*	Hay	.....	1825 120
Dorris K-2.....	1795	Own	34x4	21.7 H	18.2 L	Har	FS	Zen	V	.....	Eis	Bj	DG	.....	U	3	Own	SS	.....	5.42	18.33	32x4*	32x4*	Hay	.....	1825 120
Eugol.....	380	Own	34x4	21.7 H	18.2 L	Har	FS	Zen	V	.....	Eis	Bj	DG	.....	U	3	Own	SS	.....	5.42	18.33	32x4*	32x4*	Hay	.....	1825 120
Federal R-2.....	1495	Own	34x4	21.7 H	18.2 L	Har	FS	Zen	V	.....	Eis	Bj	DG	.....	U	3	Own	SS	.....	5.42	18.33	32x4*	32x4*	Hay	.....	1825 120
Ford T.....	1775	Own	34x4	21.7 H	18.2 L	Har	FS	Zen	V	.....	Eis	Bj	DG	.....	U	3	Own	SS	.....	5.42	18.33	32x4*	32x4*	Hay	.....	1825 120
Fulton A.....	1590	Own	34x4	21.7 H	18.2 L	Har	FS	Zen	V	.....	Eis	Bj	DG	.....	U	3	Own	SS	.....	5.42	18.33	32x4*	32x4*	Hay	.....	1825 120
Garford 15.....	1685	Own	34x4	21.7 H	18.2 L	Har	FS	Zen	V	.....	Eis	Bj	DG	.....	U	3	Own	SS	.....	5.42	18.33	32x4*	32x4*	Hay	.....	1825 120
Gary F. C. K-16.....	1265	Own	34x4	21.7 H	18.2 L	Har	FS	Zen	V	.....	Eis	Bj	DG	.....	U	3	Own	SS	.....	5.42	18.33	32x4*	32x4*	Hay	.....	1825 120
Gottfredson.....	1245	Own	34x4	21.7 H	18.2 L	Har	FS	Zen	V	.....	Eis	Bj	DG	.....	U	3	Own	SS	.....	5.42	18.33	32x4*	32x4*	Hay	.....	1825 120
Graham Brothers B.....	2000	Own	34x4	21.7 H	18.2 L	Har	FS	Zen	V	.....	Eis	Bj	DG	.....	U	3	Own	SS	.....	5.42	18.33	32x4*	32x4*	Hay	.....	1825 120
Graham-Pioneer 10-SpT.....	2000	Own	34x4	21.7 H	18.2 L	Har	FS	Zen	V	.....	Eis	Bj	DG	.....	U	3	Own	SS	.....	5.42	18.33	32x4*	32x4*	Hay	.....	1825 120
Hal-Fur D.....	2000	Own	34x4	21.7 H	18.2 L	Har	FS	Zen	V	.....	Eis	Bj	DG	.....	U	3	Own	SS	.....	5.42	18.33	32x4*	32x4*	Hay	.....	1825 120

Hawkeye.....	1375	Buda WTU	34x5 1/2	22.5 L	GC	F	Zen	G	Eis	Full	B-Li 30	U	3	Bld	Det	I	Clark	D	6.25	18.75	Ros	34x5	34x5	34x5	Day	Fir	3250 126
Independent B (Iowa).....	1665	Cont N	34x5	19.6 L	GC	F	Zen	G	Eis	Full	B-Li 30	U	3	Bld	Det	I	Clark	D	6.11	24.9	Lav	34x5	34x5	34x5	Day	Fir	3250 126
Indiana Highway Exp.....	1250	Waco BUX	34x5 1/2	22.5 L	Fed	F	Zen	G	Eis	Full	B-Li 30	U	3	Bld	Det	I	Clark	D	6.3	25.2	CAS	34x5	34x5	34x5	Day	Fir	3250 126
Int'l Speed Truck S.....	1550	Lyco-Int'l	34x5 1/2	19.6 L	Lng	F	Zen	G	Eis	Full	B-Li 30	U	3	Bld	Det	I	Clark	D	7	23.5	Ovn	34x5	34x5	34x5	Day	Fir	3250 126
International 21.....	1550	H-Sp 7000	34x5 1/2	19.6 L	Ovn	F	Zen	G	Eis	Full	B-Li 30	U	3	Bld	Det	I	Clark	D	5.3	24	Lav	34x5	34x5	34x5	Day	Fir	3250 126
Kearna H.....	1855	Cont J-4	34x5 1/2	24.2 L	McC	F	Zen	G	Eis	Full	B-Li 30	U	3	Bld	Det	I	Clark	D	5.3	24	Lav	34x5	34x5	34x5	Day	Fir	3250 126
Kissel Express.....	1855	Ovn 80000	34x5 1/2	24.2 L	Per	F	Zen	G	Eis	Full	B-Li 30	U	3	Bld	Det	I	Clark	D	5.3	24	Lav	34x5	34x5	34x5	Day	Fir	3250 126
Kleiber AA.....	1855	Cont J-4	34x5 1/2	24.2 L	Ovn	F	Zen	G	Eis	Full	B-Li 30	U	3	Bld	Det	I	Clark	D	5.3	24	Lav	34x5	34x5	34x5	Day	Fir	3250 126
Laedinghaus C.....	1895	H-Sp 7000	34x5 1/2	24.2 L	Per	F	Zen	G	Eis	Full	B-Li 30	U	3	Bld	Det	I	Clark	D	5.3	24	Lav	34x5	34x5	34x5	Day	Fir	3250 126
Manneche Hurryton.....	1895	H-Sp 7000	34x5 1/2	24.2 L	Per	F	Zen	G	Eis	Full	B-Li 30	U	3	Bld	Det	I	Clark	D	5.3	24	Lav	34x5	34x5	34x5	Day	Fir	3250 126
Morland R.....	1895	H-Sp 7000	34x5 1/2	24.2 L	Per	F	Zen	G	Eis	Full	B-Li 30	U	3	Bld	Det	I	Clark	D	5.3	24	Lav	34x5	34x5	34x5	Day	Fir	3250 126
Nash 1918.....	1895	Cont J-4	34x5 1/2	24.2 L	Per	F	Zen	G	Eis	Full	B-Li 30	U	3	Bld	Det	I	Clark	D	5.3	24	Lav	34x5	34x5	34x5	Day	Fir	3250 126
Nelson-LeeMoon G-1.....	1895	Cont J-4	34x5 1/2	24.2 L	Per	F	Zen	G	Eis	Full	B-Li 30	U	3	Bld	Det	I	Clark	D	5.3	24	Lav	34x5	34x5	34x5	Day	Fir	3250 126
Noble A-75.....	1895	Cont J-4	34x5 1/2	24.2 L	Per	F	Zen	G	Eis	Full	B-Li 30	U	3	Bld	Det	I	Clark	D	5.3	24	Lav	34x5	34x5	34x5	Day	Fir	3250 126
O. K. T-75.....	1895	Cont J-4	34x5 1/2	24.2 L	Per	F	Zen	G	Eis	Full	B-Li 30	U	3	Bld	Det	I	Clark	D	5.3	24	Lav	34x5	34x5	34x5	Day	Fir	3250 126
Palmolive.....	1895	Cont J-4	34x5 1/2	24.2 L	Per	F	Zen	G	Eis	Full	B-Li 30	U	3	Bld	Det	I	Clark	D	5.3	24	Lav	34x5	34x5	34x5	Day	Fir	3250 126
Parker B-23.....	1895	Cont J-4	34x5 1/2	24.2 L	Per	F	Zen	G	Eis	Full	B-Li 30	U	3	Bld	Det	I	Clark	D	5.3	24	Lav	34x5	34x5	34x5	Day	Fir	3250 126
Pioneer Revers.....	1895	Cont J-4	34x5 1/2	24.2 L	Per	F	Zen	G	Eis	Full	B-Li 30	U	3	Bld	Det	I	Clark	D	5.3	24	Lav	34x5	34x5	34x5	Day	Fir	3250 126
Rainier R-20.....	1895	Cont J-4	34x5 1/2	24.2 L	Per	F	Zen	G	Eis	Full	B-Li 30	U	3	Bld	Det	I	Clark	D	5.3	24	Lav	34x5	34x5	34x5	Day	Fir	3250 126

TRADE NAME AND MODEL	Chassis Price	ENGINE DETAILS										GEARSET			FRONT AXLE		REAR AXLE		Total Gear Reduction in High	Total Gear Reduction in Low	Steering Gear (Make)	TIRES, WHEELS, RIMS		Chassis Weight (Stripped)					
		Bore and Stroke	N.A.C.C. Horsepower	Valve Arrangement	Radiator (Make)	Lubrication	Carburetor	Fuel Feed	Governor (Make)	Ignition System	Engine Starter	Clutch (Make)	Make and Model Number	Location	Speeds	Universal (Make)	Springs (Make)	Front Axle and Model Number				Final Drive	Make and Model Number		Type				
1																													
Climber A-20	1750	H-Sp 7000	3½x5	19.6	L	Chic	FS	Srtm	V	Mon	AtK	Wes	Hart	M-P	U	3	Hart	Lah	Torb A	D	8	36.1	36.1	Ros	36x6	38x7	Roy	Fir	4150
Commercia 14B	3150	Buda ITU	4 x5½	22.5	L	Bug	FS	Zen	V	Sim	Eis	Bos	B-Li	B-Li	A	4	U-M	Am	Tim	103	7	37.45	37.45	Ros	36x6	38x7	Roy	Fir	4135
Concord A	2170	Cont J-4	3½x5	22.5	L	McC	FS	Strm	V	Mon	Eis	Bos	B-Li	B-Li	U	3	U-M	Am	Tim	103	7	37.45	37.45	Ros	36x6	38x7	Roy	Fir	4135
Corbett D-22	2300	H-Sp 7000	3½x5	19.6	L	McC	FS	Strm	V	Mon	Eis	Bos	B-Li	B-Li	U	3	U-M	Am	Tim	103	7	37.45	37.45	Ros	36x6	38x7	Roy	Fir	4135
Cyclone A	2350	Cont J-4	3½x5	22.5	L	McC	FS	Strm	V	Mon	Eis	Bos	B-Li	B-Li	U	3	U-M	Am	Tim	103	7	37.45	37.45	Ros	36x6	38x7	Roy	Fir	4135
Day-Elmer B-N	2180	Buda WU	3½x5	22.5	L	Chic	FS	Strm	V	Mon	Eis	Bos	B-Li	B-Li	U	3	U-M	Am	Tim	103	7	37.45	37.45	Ros	36x6	38x7	Roy	Fir	4135
Deborn F	2300	Cont N	3½x5	22.5	L	Chic	FS	Strm	V	Mon	Eis	Bos	B-Li	B-Li	U	3	U-M	Am	Tim	103	7	37.45	37.45	Ros	36x6	38x7	Roy	Fir	4135
Deborn FX	2300	Cont N	3½x5	22.5	L	Chic	FS	Strm	V	Mon	Eis	Bos	B-Li	B-Li	U	3	U-M	Am	Tim	103	7	37.45	37.45	Ros	36x6	38x7	Roy	Fir	4135
Defiance D 2	2300	Cont N	3½x5	22.5	L	Chic	FS	Strm	V	Mon	Eis	Bos	B-Li	B-Li	U	3	U-M	Am	Tim	103	7	37.45	37.45	Ros	36x6	38x7	Roy	Fir	4135
Diamond T-T	2300	Cont N	3½x5	22.5	L	Chic	FS	Strm	V	Mon	Eis	Bos	B-Li	B-Li	U	3	U-M	Am	Tim	103	7	37.45	37.45	Ros	36x6	38x7	Roy	Fir	4135
Diamond T-T	2300	Cont N	3½x5	22.5	L	Chic	FS	Strm	V	Mon	Eis	Bos	B-Li	B-Li	U	3	U-M	Am	Tim	103	7	37.45	37.45	Ros	36x6	38x7	Roy	Fir	4135
Diamond T-T	2300	Cont N	3½x5	22.5	L	Chic	FS	Strm	V	Mon	Eis	Bos	B-Li	B-Li	U	3	U-M	Am	Tim	103	7	37.45	37.45	Ros	36x6	38x7	Roy	Fir	4135
Diamond T-T	2300	Cont N	3½x5	22.5	L	Chic	FS	Strm	V	Mon	Eis	Bos	B-Li	B-Li	U	3	U-M	Am	Tim	103	7	37.45	37.45	Ros	36x6	38x7	Roy	Fir	4135
Diamond T-T	2300	Cont N	3½x5	22.5	L	Chic	FS	Strm	V	Mon	Eis	Bos	B-Li	B-Li	U	3	U-M	Am	Tim	103	7	37.45	37.45	Ros	36x6	38x7	Roy	Fir	4135
Diamond T-T	2300	Cont N	3½x5	22.5	L	Chic	FS	Strm	V	Mon	Eis	Bos	B-Li	B-Li	U	3	U-M	Am	Tim	103	7	37.45	37.45	Ros	36x6	38x7	Roy	Fir	4135
Diamond T-T	2300	Cont N	3½x5	22.5	L	Chic	FS	Strm	V	Mon	Eis	Bos	B-Li	B-Li	U	3	U-M	Am	Tim	103	7	37.45	37.45	Ros	36x6	38x7	Roy	Fir	4135
Diamond T-T	2300	Cont N	3½x5	22.5	L	Chic	FS	Strm	V	Mon	Eis	Bos	B-Li	B-Li	U	3	U-M	Am	Tim	103	7	37.45	37.45	Ros	36x6	38x7	Roy	Fir	4135
Diamond T-T	2300	Cont N	3½x5	22.5	L	Chic	FS	Strm	V	Mon	Eis	Bos	B-Li	B-Li	U	3	U-M	Am	Tim	103	7	37.45	37.45	Ros	36x6	38x7	Roy	Fir	4135
Diamond T-T	2300	Cont N	3½x5	22.5	L	Chic	FS	Strm	V	Mon	Eis	Bos	B-Li	B-Li	U	3	U-M	Am	Tim	103	7	37.45	37.45	Ros	36x6	38x7	Roy	Fir	4135
Diamond T-T	2300	Cont N	3½x5	22.5	L	Chic	FS	Strm	V	Mon	Eis	Bos	B-Li	B-Li	U	3	U-M	Am	Tim	103	7	37.45	37.45	Ros	36x6	38x7	Roy	Fir	4135
Diamond T-T	2300	Cont N	3½x5	22.5	L	Chic	FS	Strm	V	Mon	Eis	Bos	B-Li	B-Li	U	3	U-M	Am	Tim	103	7	37.45	37.45	Ros	36x6	38x7	Roy	Fir	4135
Diamond T-T	2300	Cont N	3½x5	22.5	L	Chic	FS	Strm	V	Mon	Eis	Bos	B-Li	B-Li	U	3	U-M	Am	Tim	103	7	37.45	37.45	Ros	36x6	38x7	Roy	Fir	4135
Diamond T-T	2300	Cont N	3½x5	22.5	L	Chic	FS	Strm	V	Mon	Eis	Bos	B-Li	B-Li	U	3	U-M	Am	Tim	103	7	37.45	37.45	Ros	36x6	38x7	Roy	Fir	4135
Diamond T-T	2300	Cont N	3½x5	22.5	L	Chic	FS	Strm	V	Mon	Eis	Bos	B-Li	B-Li	U	3	U-M	Am	Tim	103	7	37.45	37.45	Ros	36x6	38x7	Roy	Fir	4135
Diamond T-T	2300	Cont N	3½x5	22.5	L	Chic	FS	Strm	V	Mon	Eis	Bos	B-Li	B-Li	U	3	U-M	Am	Tim	103	7	37.45	37.45	Ros	36x6	38x7	Roy	Fir	4135
Diamond T-T	2300	Cont N	3½x5	22.5	L	Chic	FS	Strm	V	Mon	Eis	Bos	B-Li	B-Li	U	3	U-M	Am	Tim	103	7	37.45	37.45	Ros	36x6	38x7	Roy	Fir	4135
Diamond T-T	2300	Cont N	3½x5	22.5	L	Chic	FS	Strm	V	Mon	Eis	Bos	B-Li	B-Li	U	3	U-M	Am	Tim	103	7	37.45	37.45	Ros	36x6	38x7	Roy	Fir	4135
Diamond T-T	2300	Cont N	3½x5	22.5	L	Chic	FS	Strm	V	Mon	Eis	Bos	B-Li	B-Li	U	3	U-M	Am	Tim	103	7	37.45	37.45	Ros	36x6	38x7	Roy	Fir	4135
Diamond T-T	2300	Cont N	3½x5	22.5	L	Chic	FS	Strm	V	Mon	Eis	Bos	B-Li	B-Li	U	3	U-M	Am	Tim	103	7	37.45	37.45	Ros	36x6	38x7	Roy	Fir	4135
Diamond T-T	2300	Cont N	3½x5	22.5	L	Chic	FS	Strm	V	Mon	Eis	Bos	B-Li	B-Li	U	3	U-M	Am	Tim	103	7	37.45	37.45	Ros	36x6	38x7	Roy	Fir	4135
Diamond T-T	2300	Cont N	3½x5	22.5	L	Chic	FS	Strm	V	Mon	Eis	Bos	B-Li	B-Li	U	3	U-M	Am	Tim	103	7	37.45	37.45	Ros	36x6	38x7	Roy	Fir	4135
Diamond T-T	2300	Cont N	3½x5	22.5	L	Chic	FS	Strm	V	Mon	Eis	Bos	B-Li	B-Li	U	3	U-M	Am	Tim	103	7	37.45	37.45	Ros	36x6	38x7	Roy	Fir	4135
Diamond T-T	2300	Cont N	3½x5	22.5	L	Chic	FS	Strm	V	Mon	Eis	Bos	B-Li	B-Li	U	3	U-M	Am	Tim	103	7	37.45	37.45	Ros	36x6	38x7	Roy	Fir	4135
Diamond T-T	2300	Cont N	3½x5	22.5	L	Chic	FS	Strm	V	Mon	Eis	Bos	B-Li	B-Li	U	3	U-M	Am	Tim	103	7	37.45	37.45	Ros	36x6	38x7	Roy	Fir	4135
Diamond T-T	2300	Cont N	3½x5	22.5	L	Chic	FS	Strm	V	Mon	Eis	Bos	B-Li	B-Li	U	3	U-M	Am	Tim	103	7	37.45	37.45	Ros	36x6	38x7	Roy	Fir	4135
Diamond T-T	2300	Cont N	3½x5	22.5	L	Chic	FS	Strm	V	Mon	Eis	Bos	B-Li	B-Li	U	3	U-M	Am	Tim	103	7	37.45	37.45	Ros	36x6	38x7	Roy	Fir	4135
Diamond T-T	2300	Cont N	3½x5	22.5	L	Chic	FS	Strm	V	Mon	Eis	Bos	B-Li	B-Li	U	3	U-M	Am	Tim	103	7	37.45	37.45	Ros	36x6	38x7	Roy	Fir	4135
Diamond T-T	2300	Cont N	3½x5	22.5	L	Chic	FS	Strm	V	Mon	Eis	Bos	B-Li	B-Li	U	3	U-M	Am	Tim	103	7	37.45	37.45	Ros	36x6	38x7	Roy	Fir	4135
Diamond T-T	2300	Cont N	3½x5	22.5	L	Chic	FS	Strm	V	Mon	Eis	Bos	B-Li	B-Li	U	3	U-M	Am	Tim	103	7	37.45	37.45	Ros	36x6	38x7	Roy	Fir	4135
Diamond T-T	2300	Cont N	3½x5	22.5	L	Chic	FS	Strm	V	Mon	Eis	Bos	B-Li	B-Li	U	3	U-M	Am	Tim	103	7	37.45	37.45	Ros	36x6	38x7	Roy	Fir	4135
Diamond T-T	2300	Cont N	3½x5	22.5	L	Chic	FS	Strm	V	Mon	Eis	Bos	B-Li	B-Li	U	3	U-M	Am	Tim	103	7	37.45	37.45	Ros	36x6	38x7	Roy	Fir	4135
Diamond T-T	2300	Cont N	3½x5	22.5	L	Chic	FS	Strm	V	Mon	Eis	Bos	B-Li	B-Li	U	3	U-M	Am	Tim	103	7	37.45	37.45	Ros	36x6	38x7	Roy	Fir	4135
Diamond T-T	2300	Cont N	3½x5	22.5	L	Chic	FS	Strm	V	Mon	Eis	Bos	B-Li	B-Li	U	3	U-M	Am	Tim	103	7	37.45	37.45	Ros	36x6	38x7	Roy	Fir	4135
Diamond T-T	2300	Cont N	3½x5	22.5	L	Chic	FS	Strm	V	Mon	Eis	Bos	B-Li	B-Li	U	3	U-M	Am	Tim	103	7	37.45	37.45	Ros	36x6	38x7	Roy	Fir	4135
Diamond T-T	2300	Cont N	3½x5	22.5	L	Chic	FS	Strm	V	Mon	Eis	Bos	B-Li	B-Li	U	3	U-M	Am	Tim	103									

Stewart 15...	1870	Buda MU	3 3/4 x 5	22.5 L	Bus	F	Zen	G	Eis	Dy	Full	U	3	Spic	Det	Shel 33FA500	P	35x5*	6.7	26.8	35x5*	Way	Fir	3240	129
Stewart 9	2150	Cont N	3 3/4 x 5	22.5 L	Bus	FS	Zen	G	Eis	Full	B-Li	U	3	Hart	Det	Shel W-1501	W	35x5*	7.7	32.8	35x5*	Way	Fir	3440	129
Stewart B.	2150	Cont C-4	4 1/4 x 5 1/4	27.2 L	Bus	FS	Strm	G	Eis	Full	B-Li	U	3	Pet	Det	Shel W-103	W	35x5*	7.7	32.8	35x5*	Way	Fir	3440	129
Tiffin GW	1785	Cont N-4	3 3/4 x 5	22.5 L	Bus	FS	Zen	G	Eis	Full	B-Li	U	3	Bld	Det	Shel D-343	W	35x5*	7.7	23.25	35x5*	Way	Fir	3750	130
Tower J	1595	Buda WU	3 3/4 x 5	22.5 L	Bus	FS	Strm	G	Eis	Full	B-Li	U	3	Ther	Det	Shel D-343	W	35x5*	7.7	23.25	35x5*	Way	Fir	3750	130
Traffic Speedboy	1595	Buda WU	3 3/4 x 5	22.5 L	Bus	FS	Strm	G	Eis	Full	B-Li	U	3	Ther	Det	Shel D-343	W	35x5*	7.7	23.25	35x5*	Way	Fir	3750	130
Transport 25	1595	Buda WU	3 3/4 x 5	22.5 L	Bus	FS	Strm	G	Eis	Full	B-Li	U	3	Ther	Det	Shel D-343	W	35x5*	7.7	23.25	35x5*	Way	Fir	3750	130
Traylor B.	2390	Buda WU	3 3/4 x 5	22.5 L	Bus	FS	Strm	G	Eis	Full	B-Li	U	3	Ther	Det	Shel D-343	W	35x5*	7.7	23.25	35x5*	Way	Fir	3750	130
Triangle A	1985	Buda WU	3 3/4 x 5	22.5 L	Bus	FS	Strm	G	Eis	Full	B-Li	U	3	Ther	Det	Shel D-343	W	35x5*	7.7	23.25	35x5*	Way	Fir	3750	130
Triangle A	1985	Buda WU	3 3/4 x 5	22.5 L	Bus	FS	Strm	G	Eis	Full	B-Li	U	3	Ther	Det	Shel D-343	W	35x5*	7.7	23.25	35x5*	Way	Fir	3750	130
Triangle A	1985	Buda WU	3 3/4 x 5	22.5 L	Bus	FS	Strm	G	Eis	Full	B-Li	U	3	Ther	Det	Shel D-343	W	35x5*	7.7	23.25	35x5*	Way	Fir	3750	130
Triangle A	1985	Buda WU	3 3/4 x 5	22.5 L	Bus	FS	Strm	G	Eis	Full	B-Li	U	3	Ther	Det	Shel D-343	W	35x5*	7.7	23.25	35x5*	Way	Fir	3750	130
Triangle A	1985	Buda WU	3 3/4 x 5	22.5 L	Bus	FS	Strm	G	Eis	Full	B-Li	U	3	Ther	Det	Shel D-343	W	35x5*	7.7	23.25	35x5*	Way	Fir	3750	130
Triangle A	1985	Buda WU	3 3/4 x 5	22.5 L	Bus	FS	Strm	G	Eis	Full	B-Li	U	3	Ther	Det	Shel D-343	W	35x5*	7.7	23.25	35x5*	Way	Fir	3750	130
Triangle A	1985	Buda WU	3 3/4 x 5	22.5 L	Bus	FS	Strm	G	Eis	Full	B-Li	U	3	Ther	Det	Shel D-343	W	35x5*	7.7	23.25	35x5*	Way	Fir	3750	130
Triangle A	1985	Buda WU	3 3/4 x 5	22.5 L	Bus	FS	Strm	G	Eis	Full	B-Li	U	3	Ther	Det	Shel D-343	W	35x5*	7.7	23.25	35x5*	Way	Fir	3750	130
Triangle A	1985	Buda WU	3 3/4 x 5	22.5 L	Bus	FS	Strm	G	Eis	Full	B-Li	U	3	Ther	Det	Shel D-343	W	35x5*	7.7	23.25	35x5*	Way	Fir	3750	130
Triangle A	1985	Buda WU	3 3/4 x 5	22.5 L	Bus	FS	Strm	G	Eis	Full	B-Li	U	3	Ther	Det	Shel D-343	W	35x5*	7.7	23.25	35x5*	Way	Fir	3750	130
Triangle A	1985	Buda WU	3 3/4 x 5	22.5 L	Bus	FS	Strm	G	Eis	Full	B-Li	U	3	Ther	Det	Shel D-343	W	35x5*	7.7	23.25	35x5*	Way	Fir	3750	130
Triangle A	1985	Buda WU	3 3/4 x 5	22.5 L	Bus	FS	Strm	G	Eis	Full	B-Li	U	3	Ther	Det	Shel D-343	W	35x5*	7.7	23.25	35x5*	Way	Fir	3750	130
Triangle A	1985	Buda WU	3 3/4 x 5	22.5 L	Bus	FS	Strm	G	Eis	Full	B-Li	U	3	Ther	Det	Shel D-343	W	35x5*	7.7	23.25	35x5*	Way	Fir	3750	130
Triangle A	1985	Buda WU	3 3/4 x 5	22.5 L	Bus	FS	Strm	G	Eis	Full	B-Li	U	3	Ther	Det	Shel D-343	W	35x5*	7.7	23.25	35x5*	Way	Fir	3750	130
Triangle A	1985	Buda WU	3 3/4 x 5	22.5 L	Bus	FS	Strm	G	Eis	Full	B-Li	U	3	Ther	Det	Shel D-343	W	35x5*	7.7	23.25	35x5*	Way	Fir	3750	130
Triangle A	1985	Buda WU	3 3/4 x 5	22.5 L	Bus	FS	Strm	G	Eis	Full	B-Li	U	3	Ther	Det	Shel D-343	W	35x5*	7.7	23.25	35x5*	Way	Fir	3750	130
Triangle A	1985	Buda WU	3 3/4 x 5	22.5 L	Bus	FS	Strm	G	Eis	Full	B-Li	U	3	Ther	Det	Shel D-343	W	35x5*	7.7	23.25	35x5*	Way	Fir	3750	130
Triangle A	1985	Buda WU	3 3/4 x 5	22.5 L	Bus	FS	Strm	G	Eis	Full	B-Li	U	3	Ther	Det	Shel D-343	W	35x5*	7.7	23.25	35x5*	Way	Fir	3750	130
Triangle A	1985	Buda WU	3 3/4 x 5	22.5 L	Bus	FS	Strm	G	Eis	Full	B-Li	U	3	Ther	Det	Shel D-343	W	35x5*	7.7	23.25	35x5*	Way	Fir	3750	130
Triangle A	1985	Buda WU	3 3/4 x 5	22.5 L	Bus	FS	Strm	G	Eis	Full	B-Li	U	3	Ther	Det	Shel D-343	W	35x5*	7.7	23.25	35x5*	Way	Fir	3750	130
Triangle A	1985	Buda WU	3 3/4 x 5	22.5 L	Bus	FS	Strm	G	Eis	Full	B-Li	U	3	Ther	Det	Shel D-343	W	35x5*	7.7	23.25	35x5*	Way	Fir	3750	130
Triangle A	1985	Buda WU	3 3/4 x 5	22.5 L	Bus	FS	Strm	G	Eis	Full	B-Li	U	3	Ther	Det	Shel D-343	W	35x5*	7.7	23.25	35x5*	Way	Fir	3750	130
Triangle A	1985	Buda WU	3 3/4 x 5	22.5 L	Bus	FS	Strm	G	Eis	Full	B-Li	U	3	Ther	Det	Shel D-343	W	35x5*	7.7	23.25	35x5*	Way	Fir	3750	130
Triangle A	1985	Buda WU	3 3/4 x 5	22.5 L	Bus	FS	Strm	G	Eis	Full	B-Li	U	3	Ther	Det	Shel D-343	W	35x5*	7.7	23.25	35x5*	Way	Fir	3750	130
Triangle A	1985	Buda WU	3 3/4 x 5	22.5 L	Bus	FS	Strm	G	Eis	Full	B-Li	U	3	Ther	Det	Shel D-343	W	35x5*	7.7	23.25	35x5*	Way	Fir	3750	130
Triangle A	1985	Buda WU	3 3/4 x 5	22.5 L	Bus	FS	Strm	G	Eis	Full	B-Li	U	3	Ther	Det	Shel D-343	W	35x5*	7.7	23.25	35x5*	Way	Fir	3750	130
Triangle A	1985	Buda WU	3 3/4 x 5	22.5 L	Bus	FS	Strm	G	Eis	Full	B-Li	U	3	Ther	Det	Shel D-343	W	35x5*	7.7	23.25	35x5*	Way	Fir	3750	130
Triangle A	1985	Buda WU	3 3/4 x 5	22.5 L	Bus	FS	Strm	G	Eis	Full	B-Li	U	3	Ther	Det	Shel D-343	W	35x5*	7.7	23.25	35x5*	Way	Fir	3750	130
Triangle A	1985	Buda WU	3 3/4 x 5	22.5 L	Bus	FS	Strm	G	Eis	Full	B-Li	U	3	Ther	Det	Shel D-343	W	35x5*	7.7	23.25	35x5*	Way	Fir	3750	130
Triangle A	1985	Buda WU	3 3/4 x 5	22.5 L	Bus	FS	Strm	G	Eis	Full	B-Li	U	3	Ther	Det	Shel D-343	W	35x5*	7.7	23.25	35x5*	Way	Fir	3750	130
Triangle A	1985	Buda WU	3 3/4 x 5	22.5 L	Bus	FS	Strm	G	Eis	Full	B-Li	U	3	Ther	Det	Shel D-343	W	35x5*	7.7	23.25	35x5*	Way	Fir	3750	130
Triangle A	1985	Buda WU	3 3/4 x 5	22.5 L	Bus	FS	Strm	G	Eis	Full	B-Li	U	3	Ther	Det	Shel D-343	W	35x5*	7.7	23.25	35x5*	Way	Fir	3750	130
Triangle A	1985	Buda WU	3 3/4 x 5	22.5 L	Bus	FS	Strm	G	Eis	Full	B-Li	U	3	Ther	Det	Shel D-343	W	35x5*	7.7	23.25	35x5*	Way	Fir	3750	130
Triangle A	1985	Buda WU	3 3/4 x 5	22.5 L	Bus	FS	Strm	G	Eis	Full	B-Li	U	3	Ther	Det	Shel D-343	W	35x5*	7.7	23.25	35x5*	Way	Fir	3750	130
Triangle A	1985	Buda WU	3 3/4 x 5	22.5 L	Bus	FS	Strm	G	Eis	Full	B-Li	U	3	Ther	Det	Shel D-343	W	35x5*	7.7	23.25	35x5*	Way	Fir	3750	130
Triangle A	1985	Buda WU	3 3/4 x 5	22.5 L	Bus	FS	Strm	G	Eis	Full	B-Li	U	3	Ther	Det	Shel D-343	W	35x5*	7.7	23.25	35x5*	Way	Fir	3750	130
Triangle A	1985	Buda WU	3 3/4 x 5	22.5 L	Bus	FS	Strm	G	Eis	Full	B-Li	U	3	Ther	Det	Shel D-343	W	35x5*	7.7	23.25	35x5*	Way	Fir	3750	130
Triangle A	1985	Buda WU	3 3/4 x 5	22.5 L	Bus	FS	Strm	G	Eis	Full	B-Li	U	3	Ther	Det	Shel D-343	W	35x5*	7.7	23.25	35x5*	Way	Fir	3750	130
Triangle A	1985	Buda WU	3 3/4 x 5	22.5 L	Bus	FS	Strm	G	Eis	Full	B-Li	U	3	Ther	Det	Shel D-343	W	35x5*	7.7	23.25	35x5*	Way	Fir	3750	130
Triangle A	1985	Buda WU	3 3/4 x 5	22.5 L	Bus	FS	Strm	G	Eis	Full	B-Li	U	3	Ther	Det	Shel D-343	W	35x5*	7.7	23.25	35x5*	Way	Fir	3750	130
Triangle A	1985	Buda WU	3 3/4 x 5	22.5 L	Bus	FS	Strm	G	Eis	Full	B-Li	U	3	Ther	Det	Shel D-343	W	35x5*	7.7	23.25	35x5*	Way	Fir	3750	130
Triangle A	1985	Buda WU	3 3/4 x 5	22.5 L	Bus	FS	Strm	G	Eis	Full	B-Li	U	3	Ther	Det	Shel D-343	W	35x5*	7.7	23.25	35x5*	Way	Fir	3750	130
Triangle A	1985	Buda WU	3 3/4 x 5	22.5 L	Bus	FS	Strm	G	Eis	Full	B-Li	U	3	Ther	Det	Shel D-343	W	35x5*	7.7	23.25	35x5*	Way	Fir	3750	130
Triangle A	1985	Buda WU	3 3/4 x 5	22.5 L	Bus	FS	Strm	G	Eis	Full	B-Li	U	3	Ther	Det	Shel D-343	W	35x5*	7.7	23.25	35x5*	Way	Fir	3750	130
Triangle A	1985	Buda WU	3 3/4 x 5	22.5 L	Bus	FS	Strm	G	Eis	Full	B-Li	U	3	Ther	Det	Shel D-343	W	35x5*	7.7	23.25	35x5*	Way	Fir	3750	130
Triangle A	1985	Buda WU	3 3/4 x 5	22.5 L	Bus	FS	Strm	G	Eis	Full	B-Li	U	3	Ther	Det	Shel D-343	W	35x5*	7.7	23.25	35x5*	Way	Fir	3750	130
Triangle A	1985	Buda WU	3 3/4 x 5	22.5 L	Bus	FS	Strm	G	Eis	Full	B-Li	U	3	Ther	Det	Shel D-343	W	35x5*	7.7	23.25	35x5*	Way	Fir	3750	130
Triangle A	1985	Buda WU	3 3/4 x 5	22.5 L	Bus	FS	Strm	G	Eis	Full	B-Li	U	3	Ther	Det	Shel D-343	W	35x5*	7.7	23.25	35x5*	Way	Fir	3750	130
Triangle A	1985	Buda WU	3 3/4 x 5	22.5 L	Bus	FS	Strm	G	Eis	Full	B-Li	U	3	Ther	Det	Shel D-343	W	35x5*	7.7	23.25	35x5*	Way	Fir	3750	130
Triangle A	1985	Buda WU	3 3/4 x 5	22.5 L	Bus	FS	Strm	G	Eis	Full	B-Li	U	3	Ther	Det	Shel D-343	W	35x5*	7.7	23.25	35x5*	Way	Fir	3750	130
Triangle A	1985	Buda WU	3 3/4 x 5	22.5 L	Bus	FS	Strm	G	Eis	Full	B-Li	U	3	Ther	Det	Shel D-343	W	35x5*	7.7	23.25	35x5*	Way	Fir	3750	130
Triangle A	1985	Buda WU	3 3/4 x 5	22.5 L	Bus	FS	Strm	G	Eis	Full	B-Li	U	3	Ther	Det	Shel D-343	W	35x5*	7.7	23.25	35x5*	Way	Fir	3750	130
Triangle A	1985	Buda WU	3 3/4 x 5	22.5 L	Bus	FS	Strm	G	Eis	Full	B-Li	U	3	Ther	Det	Shel D-343	W	35x5*	7.7	23.25	35x5*	Way	Fir	3750	130
Triangle A	1985	Buda WU	3 3/4 x 5	22.5 L	Bus																				

2 To

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Case 1
Conce
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Day E
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Defian
Denby
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Dorris
Doug
Drake
Duple
Eagle
Fagel
Forset
Garcia
Gary I
G.M.C.
G.M.C.
G.M.C.
G.M.C.
Gramm
Harvey
Hewitt
Hurlbu
Indian
Intern
Kearns
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Master
Menom
Moren
Nash 3
Netco
Niles E
North
Oakes
Onaida
Oak Kos

TRADE NAME AND MODEL	Chassis Price	ENGINE DETAILS										GEARSET				Clutch (Make)	Engine Starter	Ignition System	TIRES, WHEELS, RIMS										Chassis Weight (Stripped)	Wheelbase																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																		
		Make and Model Number 4 cylinder unless otherwise noted.	Bore and Stroke	N.A.C.C. Horsepower	Valve Arrangement	Radiator (Make)	Lubrication	Carburetor	Fuel Feed	Governor (Make)	System	Universal (Make)	Front Axle and Model Number	Rear Axle					Total Gear Reduction in High	Total Gear Reduction in Low	Steering Gear (Make)	Front		Wheels (Make)	Rim Equipment																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																							
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3 Ton

Ace 60-L
Acme K (H)
Acme 60-L
Autocar H
Autocar K
Belmont E
Bethlehem

TRADE NAME AND MODEL	Chassis Price	ENGINE DETAILS										GEARSET			FRONT AXLE and Model Number	REAR AXLE		Total Gear Reduction in High	Total Gear Reduction in Low	Steering Gear (Make)	TIRES, WHEELS, RIMS		Chassis Weight (Stripped)	Wheelbase				
		Make and Model Number unless otherwise noted.	Bore and Stroke	N. A. C. C.	Horsepower	Valve Arrangement	Radiator (Make)	Lubrication	Carburetor	Fuel Feed	Governor (Make)	Ignition System	Engine Starter	Clutch (Make)		GEARSET												
																Make and Model Number	Location				Speeds							
3 Ton-Con'd																												
Buffalo Model Six	3400	Her CU-3	4 1/2 x 5 1/2	25.6	L	Own	F	Strm	V	G	Pier	Bos	Bos	Covt	B-Li 50	U	10	Spic	Shel	W	Shel W-21	F	34x5 1/2	36x5 1/2	Jon	Gdy	6200 155	155
Concord BX	3600	Buda HTU	4 1/2 x 5 1/2	28.9	L	McC	F	Strm	V	G	Sim	Bos	Bos	B-Li	Full	U	4	Spic	Shel	W	Shel W-21	F	36x5 1/2	36x5 1/2	Jon	Gdy	5550 170	170
Corbett R-22	3195	Cont K-4	4 1/2 x 5 1/2	32.4	L	Chic	F	Strm	V	G	Pier	Bos	Bos	Full	Full	U	4	Spic	Shel	W	Shel W-21	F	36x5 1/2	36x5 1/2	Jon	Gdy	6160 157	157
Defiance H12	2975	Cont K-4	4 1/2 x 5 1/2	27.2	L	Chic	F	Strm	V	G	Pier	Bos	Bos	Full	Full	U	4	Spic	Shel	W	Shel W-21	F	36x5 1/2	36x5 1/2	Jon	Gdy	5500 165	165
Denbigh 35	2950	Buda HTU	4 1/2 x 5 1/2	28.9	L	Own	F	Strm	V	G	Sim	Bos	Bos	Full	Full	U	4	Spic	Shel	W	Shel W-21	F	36x5 1/2	36x5 1/2	Jon	Gdy	4500 155	155
Dependable E	2950	Buda HTU	4 1/2 x 5 1/2	28.9	L	Own	F	Strm	V	G	Sim	Bos	Bos	Full	Full	U	4	Spic	Shel	W	Shel W-21	F	36x5 1/2	36x5 1/2	Jon	Gdy	4750 130	130
Douglas I-3	3900	Wau CU	4 1/2 x 5 1/2	30.6	L	Own	F	Strm	V	G	Pier	Bos	Bos	Full	Full	U	4	Spic	Shel	W	Shel W-21	F	36x5 1/2	36x5 1/2	Jon	Gdy	4600 155	155
Fagel	4200	Cont C-4	4 1/2 x 5 1/2	30.6	L	Own	F	Strm	V	G	Pier	Bos	Bos	Full	Full	U	4	Spic	Shel	W	Shel W-21	F	36x5 1/2	36x5 1/2	Jon	Gdy	4600 155	155
Forscher E	4500	Wau CU	4 1/2 x 5 1/2	30.6	L	Own	F	Strm	V	G	Pier	Bos	Bos	Full	Full	U	4	Spic	Shel	W	Shel W-21	F	36x5 1/2	36x5 1/2	Jon	Gdy	4600 155	155
F. W. D. B.	4200	Buda YTU	4 1/2 x 5 1/2	32.4	L	Own	F	Strm	V	G	Pier	Bos	Bos	Full	Full	U	4	Spic	Shel	W	Shel W-21	F	36x5 1/2	36x5 1/2	Jon	Gdy	4600 155	155
Gramm-Pioneer 30	3300	Hin HA 500	4 1/2 x 5 1/2	28.9	L	Own	F	Strm	V	G	Pier	Bos	Bos	Full	Full	U	4	Spic	Shel	W	Shel W-21	F	36x5 1/2	36x5 1/2	Jon	Gdy	4600 155	155
Hurlburt B.	3150	Buda HU	4 1/2 x 5 1/2	32.4	L	Own	F	Strm	V	G	Pier	Bos	Bos	Full	Full	U	4	Spic	Shel	W	Shel W-21	F	36x5 1/2	36x5 1/2	Jon	Gdy	4600 155	155
International 61	2400	Own	4 1/2 x 5 1/2	32.4	L	Own	F	Strm	V	G	Pier	Bos	Bos	Full	Full	U	4	Spic	Shel	W	Shel W-21	F	36x5 1/2	36x5 1/2	Jon	Gdy	4600 155	155
Macfar H2	3500	Cont L-4	4 1/2 x 5 1/2	32.4	L	Own	F	Strm	V	G	Pier	Bos	Bos	Full	Full	U	4	Spic	Shel	W	Shel W-21	F	36x5 1/2	36x5 1/2	Jon	Gdy	4600 155	155
Moreland A.X.	3000	Hin HA 200	4 1/2 x 5 1/2	32.4	L	Own	F	Strm	V	G	Pier	Bos	Bos	Full	Full	U	4	Spic	Shel	W	Shel W-21	F	36x5 1/2	36x5 1/2	Jon	Gdy	4600 155	155
Patriot Washington Spec	2875	Cont K-4	4 1/2 x 5 1/2	27.2	L	Own	F	Strm	V	G	Pier	Bos	Bos	Full	Full	U	4	Spic	Shel	W	Shel W-21	F	36x5 1/2	36x5 1/2	Jon	Gdy	4600 155	155
Perfection D.	3600	Own	4 1/2 x 5 1/2	32.4	L	Own	F	Strm	V	G	Pier	Bos	Bos	Full	Full	U	4	Spic	Shel	W	Shel W-21	F	36x5 1/2	36x5 1/2	Jon	Gdy	4600 155	155
Pittsburgher C.	2195	Cont C-2	4 1/2 x 5 1/2	27.2	L	Own	F	Strm	V	G	Pier	Bos	Bos	Full	Full	U	4	Spic	Shel	W	Shel W-21	F	36x5 1/2	36x5 1/2	Jon	Gdy	4600 155	155
Republic 19	3000	Hin HA 500	4 1/2 x 5 1/2	28.9	L	Own	F	Strm	V	G	Pier	Bos	Bos	Full	Full	U	4	Spic	Shel	W	Shel W-21	F	36x5 1/2	36x5 1/2	Jon	Gdy	4600 155	155
Reynolds 23-B.	3000	Hin HA 500	4 1/2 x 5 1/2	28.9	L	Own	F	Strm	V	G	Pier	Bos	Bos	Full	Full	U	4	Spic	Shel	W	Shel W-21	F	36x5 1/2	36x5 1/2	Jon	Gdy	4600 155	155
Rowe GPW 3.	3200	Hin HA 500	4 1/2 x 5 1/2	28.9	L	Own	F	Strm	V	G	Pier	Bos	Bos	Full	Full	U	4	Spic	Shel	W	Shel W-21	F	36x5 1/2	36x5 1/2	Jon	Gdy	4600 155	155
Rowe GPW 3.	4150	W. T. A.	4 1/2 x 5 1/2	25.6	L	Own	F	Strm	V	G	Pier	Bos	Bos	Full	Full	U	4	Spic	Shel	W	Shel W-21	F	36x5 1/2	36x5 1/2	Jon	Gdy	4600 155	155
Schachtz J.S.	3800	Buda HTU	4 1/2 x 5 1/2	28.9	L	Own	F	Strm	V	G	Pier	Bos	Bos	Full	Full	U	4	Spic	Shel	W	Shel W-21	F	36x5 1/2	36x5 1/2	Jon	Gdy	4600 155	155
Schwartz L.	3600	Buda HTU	4 1/2 x 5 1/2	28.9	L	Own	F	Strm	V	G	Pier	Bos	Bos	Full	Full	U	4	Spic	Shel	W	Shel W-21	F	36x5 1/2	36x5 1/2	Jon	Gdy	4600 155	155
Schwartz L.	3600	Buda HTU	4 1/2 x 5 1/2	28.9	L	Own	F	Strm	V	G	Pier	Bos	Bos	Full	Full	U	4	Spic	Shel	W	Shel W-21	F	36x5 1/2	36x5 1/2	Jon	Gdy	4600 155	155
Schwartz L.	3600	Buda HTU	4 1/2 x 5 1/2	28.9	L	Own	F	Strm	V	G	Pier	Bos	Bos	Full	Full	U	4	Spic	Shel	W	Shel W-21	F	36x5 1/2	36x5 1/2	Jon	Gdy	4600 155	155
Service 62.	3150	Mid 402	4 1/2 x 5 1/2	22.5	H	Own	F	Strm	V	G	Pier	Bos	Bos	Full	Full	U	4	Spic	Shel	W	Shel W-21	F	36x5 1/2	36x5 1/2	Jon	Gdy	4600 155	155
Straight 6000	1895	Cont C-2	4 1/2 x 5 1/2	27.2	L	Own	F	Strm	V	G	Pier	Bos	Bos	Full	Full	U	4	Spic	Shel	W	Shel W-21	F	36x5 1/2	36x5 1/2	Jon	Gdy	4600 155	155
Transport 55	3300	Buda HTU	4 1/2 x 5 1/2	28.9	L	Own	F	Strm	V	G	Pier	Bos	Bos	Full	Full	U	4	Spic	Shel	W	Shel W-21	F	36x5 1/2	36x5 1/2	Jon	Gdy	4600 155	155
Ultramar BL	3800	Buda HTU	4 1/2 x 5 1/2	28.9	L	Own	F	Strm	V	G	Pier	Bos	Bos	Full	Full	U	4	Spic	Shel	W	Shel W-21	F	36x5 1/2	36x5 1/2	Jon	Gdy	4600 155	155
U. S. R.	2675	Own	4 1/2 x 5 1/2	25.6	L	Own	F	Strm	V	G	Pier	Bos	Bos	Full	Full	U	4	Spic	Shel	W	Shel W-21	F	36x5 1/2	36x5 1/2	Jon	Gdy	4600 155	155
Wichita RX	3200	Wau CU	4 1/2 x 5 1/2	30.6	L	Own	F	Strm	V	G	Pier	Bos	Bos	Full	Full	U	4	Spic	Shel	W	Shel W-21	F	36x5 1/2	36x5 1/2	Jon	Gdy	4600 155	155
Winther 51.	3175	Wau TAU	4 1/2 x 5 1/2	25.6	L	Own	F	Strm	V	G	Pier	Bos	Bos	Full	Full	U	4	Spic	Shel	W	Shel W-21	F	36x5 1/2	36x5 1/2	Jon	Gdy	4600 155	155
3 1/2 Ton																												
Acason A-4.	.....	Wau	4 1/2 x 5 1/2	30.6	L	Own	F	Strm	V	G	Pier	Bos	Bos	Full	Full	U	4	Spic	Shel	W	Shel W-21	F	36x5 1/2	36x5 1/2	Jon	Gdy	4600 155	155
Acme 90.	.....	Cont L-4	4 1/2 x 5 1/2	32.4	L	Own	F	Strm	V	G	Pier	Bos	Bos	Full	Full	U	4	Spic	Shel	W	Shel W-21	F	36x5 1/2	36x5 1/2	Jon	Gdy	4600 155	155
American LaFrance 3R	4200	Own	4 1/2 x 5 1/2	32.4	L	Own	F	Strm	V	G	Pier	Bos	Bos	Full	Full	U	4	Spic	Shel	W	Shel W-21	F	36x5 1/2	36x5 1/2	Jon	Gdy	4600 155	155
Armstrong KWB	4200	Buda YTU	4 1/2 x 5 1/2	32.4	L	Own	F	Strm	V	G	Pier	Bos	Bos	Full	Full	U	4	Spic	Shel	W	Shel W-21	F	36x5 1/2	36x5 1/2	Jon	Gdy	4600 155	155
Armstrong KWB	4200	Cont E-4	4 1/2 x 5 1/2	32.4	L	Own	F	Strm	V	G	Pier	Bos	Bos	Full	Full	U	4	Spic	Shel	W	Shel W-21	F	36x5 1/2	36x5 1/2	Jon	Gdy	4600 155	155
Atterbury 22DX Short	4375	Cont L-4	4 1/2 x 5 1/2	32.4	L	Own	F	Strm	V	G	Pier	Bos	Bos	Full	Full	U	4	Spic	Shel	W	Shel W-21	F	36x5 1/2	36x5 1/2	Jon	Gdy	4600 155	155
Atterbury 22DX Std	4375	Cont L-4	4 1/2 x 5 1/2	32.4	L	Own	F	Strm	V	G	Pier	Bos	Bos	Full	Full	U	4	Spic	Shel	W	Shel W-21	F	36x5 1/2	36x5 1/2	Jon	Gdy	4600 155	155
Atterbury 22D LWB.	4375	Cont L-4	4 1/2 x 5 1/2	32.4	L	Own	F	Strm	V	G	Pier	Bos	Bos	Full	Full	U	4	Spic	Shel	W	Shel W-21	F	36x5 1/2	36x5 1/2	Jon	Gdy	4600 155	155
Atterbury 22D LWB.	4375	Cont L-4	4 1/2 x 5 1/2	32.4	L	Own	F	Strm	V	G	Pier	Bos	Bos	Full	Full	U	4	Spic	Shel	W	Shel W-21	F	36x5 1/2	36x5 1/2	Jon	Gdy	4600 155	155
Atterbury 22D LWB.	4375	Cont L-4	4 1/2 x 5 1/2	32.4	L	Own	F	Strm	V	G	Pier	Bos	Bos	Full	Full	U	4	Spic	Shel	W	Shel W-21	F	36x5 1/2	36x5 1/2	Jon	Gdy	4600 155	155
Atterbury 22D LWB.	4375	Cont L-4	4 1/2 x 5 1/2	32.4	L	Own	F	Strm	V	G	Pier	Bos	Bos	Full	Full	U	4	Spic	Shel	W	Shel W-21	F	36x5 1/2	36x5 1/2	Jon	Gdy	4600 155	155
Atterbury 22D LWB.	4375	Cont L-4	4 1/2 x 5 1/2	32.4	L	Own	F	Strm	V	G	Pier	Bos	Bos	Full	Full	U	4	Spic	Shel	W	Shel W-21	F	36x5 1/2					

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Steel and Rubber Markets

Steel Products Prices

Quotations are f. o. b. Pittsburgh. Freight rates from Pittsburgh in carload lots per 100 pounds to points named are as follows: New York, 34c; Philadelphia, 32½c; Boston, 36½c; Buffalo, 26½c; Cleveland, 21½c; Chicago, 24c.

Semi-finished—Gross tons

Billets, rerolling	\$45 00	a 47 50
forging	55 00	a
Sheet bars	45 00	a 46 00
Slabs	45 00	a 47 50
Wire rods	51 00	a
Skeip (cents per pound).....	2 56	a 2 80

Sheets

Blue annealed	\$3 25	a	3 50
Black	3 85	a	4 00
Galvanized	5 25	a	5 50
Auto body	5 25	a	5 75
Strips, hot rolled	3 30	a	3 50
cold rolled	5 50	a	5 50
Hoops	3 30	a	3 60
Bands	3 30	a	3 50
Tin Plate (per base box)...	6 00	a	...

Hot rolled

Bars	2 40	a	2 65
Plates	2 50	a	2 75
Shapes	2 50	a	2 75
Rails, standard (gross ton)..	43 00	a	....
Light	2 25	a	....

Rubber dull, weak—

Plantations—		
1st latex, cr., spot.....	30%	a
May.....		a 30½
June.....		a 30½
July-September.....		a 30½
October-December.....		a 31½
Ribbed, smk. sh., spot.....		a 30½
May.....		a 30½
June.....		a 30½
July-September.....		a 30½
October-December.....		a 31½
*Brown crepe, thin, clean.....		a 28½
*Specky.....		a 27½
Rolled.....		a 26½
Amber—		
*No. 1.....		a 30½
*No. 2.....		a 29
*No. 3.....		a 28½
Para—		
Up-river, fine.....		a 27½
coarse.....		a 25
*Island, fine.....		a 25½
coarse.....		a 15
Caucho Ball— *Upper.....		a 26½
*Lower.....	25	a
Cameta.....		a 15
*Centrals—		
Corinto.....	25	a
Esmeralda.....	25	a
*Mexican scrap.....	24	a
*Guayule—		
Wet.....		a
Dry.....		a 29
Balata—		
Block, Ciudad.....	75	a
Block, Columbian.....	60	a
Panama.....	38	a
Sheet.....	30	a
Massal—		
Prime.....		a 21½
*Benuela—		
No. 2.....		a
*Kassal—		
Br. black.....		a 30½
Fr. red.....		a 25½

* Nominal.

Omnibus Services Becoming Popular in Holland

The registration of motor vehicles in Rotterdam on January 1, 1923, totaled 761 passenger cars, 381 taxicabs and omnibuses, 911 trucks, 44 postal service cars and 6 ambulances, which represented an increase of 432, as compared with registration of the previous year. Most of the omnibus services have been established in the last few months between Rotterdam and various small towns and villages in that vicinity. The chassis of a low-priced popular American car is being used with a locally built body of rather heavy construction. The business is apparently profitable, and it is expected that it will expand rapidly, says Consul General George E. Anderson, in a report to the Department of Commerce.

Manufacturers and Models Included in Specifications on Preceding Pages

- Acason—2, 2½, 3½, 5—The Acason Corp., Detroit, Mich.
 Ace—1½, 2½—American Motor Truck Co., Newark, Ohio.
 ★Acme—1, 1½, 2, 3, 3½, 4½, 6½—Acme Motor Truck Co., Cadillac, Mich.
 American—2½, 4, 5—American Motor Truck & Tractor Co., Portland, Conn.
 ★American La France—¾, 2, 3½, 5—American La France Fire Engine Co., Inc., Elmira, N. Y.
 Armleder—1, 1½, 2½, 3½—O. Armleder Motor Truck Co., Cincinnati Ohio.
 Atco—1½, 2½—American Truck & Trailer Corp., Kankakee, Ill.
 Atlas—1, 1½—Industrial Motor Corp., Rochester, N. Y.
 ★Atterbury—1½, 2½, 3½, 5—Atterbury Motor Car Co., Buffalo, N. Y.
 ★Autocar—1, 1½, 1½, 2, 2½, 3, 4, 5 to 7—Autocar Co., Ardmore, Pa.
 Available—1½, 2, 2½, 3½, 5—Available Truck Co., Chicago, Ill.
 Avery—1—Avery Company, Peoria, Ill.
 Bell—1, 1½, 2½—Jawa Motor Truck Co., Ottumwa, Ia.
 Belmont—1, 1½, 2, 2½, 3—Belmont Motors Corp., Harrisburg, Pa.
 ★Bessemer—1, 1½, 2½, 4—Bessemer Motor Truck Co., Grove City, Pa.
 Bethlehem—1, 2, 3—Bethlehem Motors Corp., Allentown, Pa.
 Betz—7, 2½—Betz Motor Truck Co., Hammond, Ind.
 Bridgeport—1½, 2½, 3½—Bridgeport Motor Truck Co., Bridgeport, Conn.
 Brinton—1½, 2½—Brinton Motor Truck Co., Philadelphia, Pa.
 Brockway—¾, 1½, 2½, 3½, 5—Brockway Motor Truck Co., Cortland, N. Y.
 Brown—2½—Brown Truck Co., Duluth, Minn.
 ★Buffalo—2, 3—Buffalo Truck and Tractor Corp., Clarence, N. Y.
 Buick—¾—Buick Motor Co., Flint, Mich.
 C. T.—1, 1½, 2, 3½, 5—Commercial Truck Co., Philadelphia, Pa.
 Casco—1—Casco Motors, Inc., Portland, Maine.
 Case—2—J. I. Case Plow Works Co., Racine, Wis.
 Chevrolet—¾, 1—Chevrolet Motor Co. of Mich., Flint, Mich.
 Chicago—1½, 2½, 3½, 5—Chicago Motor Truck, Inc., Chicago, Ill.
 Climber—1½—Climber Motor Corp., Little Rock, Ark.
 Clydesdale—1½, 2½, 3½, 5, 7—Clydesdale Motor Truck Co., Clyde, Ohio.
 ★Commerce—¾, 1½, 2½—Commerce Motor Truck Co., Detroit, Mich.
 Concord—1½, 2, 2½, 3—Abbott-Downing Truck & Body Co., Concord, N. H.
 Corbitt—¾, 1, 1½, 2, 2½, 3, 4, 5—Corbitt Motor Truck Co., Henderson, N. C.
 Cyclone—1½—The Cyclone Motor Corp., Greenville, S. C.
 ★Day-Elder—1, 1½, 2, 2½, 3½, 5—Day-Elder Motors Corp., Newark, N. J.
 Dearborn—1, 1½, 2—Dearborn Truck Co., Chicago, Ill.
 Defiance—1½, 1½, 2, 3—Defiance Motor Truck Co., Defiance, Ohio.
 ★Denby—1½, 2, 3, 4, 5—Denby Motor Truck Co., Detroit, Mich.
 Dependable—1½, 2, 2½, 3, 3½—Dependable Truck & Tractor Co., East St. Louis, Ill.
 Diamond T—1½, 1½, 2½, 3½, 5—Diamond T Motor Car Co., Chicago, Ill.
 Diehl—1, 1½—Diehl Motor Truck Works, Philadelphia, Pa.
 Dixon—1½, 2½, 3½—Dixon Motor Truck Co., Altoona, Pa.
 Dodge—¾—Dodge Bros., Detroit, Mich.
 D-Olt—1, 1½, 2½, 5—D-Olt Motor Truck Co., Inc., Long Island City, N. Y.
 Dorris—1, 2, 3½—Dorris Motor Car Co., St. Louis, Mo.
 Dort—¾—Dort Motor Car Co., Flint, Mich.
 Double Drive—4—Double Drive Truck Co., Benton Harbor, Mich.
 Douglas—1½, 2, 3—Douglas Motors Corp., Omaha, Neb.
 Drake—2—Drake Motor & Tire Mfg. Corp., Knoxville, Tenn.
 ★Duplex—2, 3½—Duplex Truck Co., Lansing, Mich.
 Eagle—1½, 2—Eagle Motor Truck Corp., St. Louis, Mo.
 Eugol—1—Eugol Motor Truck Co., Chicago, Ill.
 F. W. D.—3—Four-Wheel Drive Auto Co., Clintonville, Wis.
 Facto—2½—Facto Motor Trucks, Springfield, Mass.
 Fageol—2, 3, 4, 5—Fageol Motors Co., Oakland, Cal.
 ★Federal—¾, 1, 1½, 2, 3½, 5, T.T.—Federal Motor Truck Co., Detroit, Mich.
 Ford—1—Ford Motor Co., Highland Park, Mich.
 Front Drive—1½—Double Drive Truck Co., Benton Harbor, Mich.
 Fulton—1, 2—Fulton Motors Corp., Farmingdale, N. Y.
 ★G. M. C.—1, 2, 3½, 5—General Motors Truck Co., Pontiac, Mich.
 G. W. W.—1½—Wilson Truck Mfg. Co., Henderson, Ia.
 ★Garford—1, 1½, 2½, 4, 5, 7½—Garford Motor Truck Co., Lima, O.
 ★Gary—1, 2, 2½, 3½, 5—Gary Motor Corp., Gary, Ill.
 Gotfredson—1, 1½, 2½, 4, 5—Gotfredson Truck Corp., Ltd., Walkerville, Ont.
 ★Graham—1, 1½—Graham Brothers, Evansville, Ind.
 ★Gramm-Bernstein—1, 1½, 2, 3, 3½, 4, 5—Gramm-Bernstein Motor Truck Co., Lima, Ohio.
 Hal-Fur—2, 3½—Hal-Fur Motor Truck Co., Cleveland, Ohio.
 Hall—2½, 3½, 5, 7—Lewis-Hall Motors Corp., Detroit, Mich.
 Harvey—2, 2½, 3½, 6, 10—Harvey Motor Truck Co., Harvey, Ill.
 Hawkeye—1, 1½, 2½, 3½—Hawkeye Truck Co., Sioux City, Iowa.
 Hendrickson—2½, 3½, 5—Hendrickson Motor Truck Co., Chicago, Ill.
 Hewitt-Ludlow—2, 2½, 3½, 5—Hewitt-Ludlow Co., Inc., San Francisco, Cal.
 Hug—1½—The Hug Co., Highland, Ill.
 Hurlburt—1½, 2½, 3½, 5, 7—Harrisburg Mfg. & Boiler Co., Harrisburg, Pa.
 Independent—1, 1½, 2½—Independent Motor Truck Co., Inc., Daventry, Ia.
 Indiana—1, 1½, 2, 2½, 3½, 5—Indiana Truck Corp., Marion, Ind.
 ★International—¾, 1, 1½, 2, 2½, 3, 5—International Harvester Co., Chicago, Ill.
 Jackson—3½—Jackson Motors Corp., Jackson, Mich.
 Kalamazoo—1½, 2½, 3½, 5—Kalamazoo Motor Corp., Kalamazoo, Mich.
 Kearns—1, 1½, 2—Kearns-Dughe Motors Co., Danville, Pa.
 Kelland—Kelland Motor Car Co., Newark, N. J.
 Kelly-Springfield—1½, 2½, 3½, 5, 6—Kelly-Springfield Motor Truck Co., Springfield, O.
 Kenworth—1½, 2½, 3—Kenworth Motor Truck Corp., Seattle, Wash.
 Keystone—2—Keystone Motor Truck Corp., Oaks, Pa.
 ★Kissel—1, 1½, 2½, 4—Kissel Motor Car Co., Hartford, Wis.
 Kleiber—1, 1½, 2, 2½, 3½, 5—Kleiber & Co., Inc., San Francisco, Cal.
 Lange—2, 2½—Lange Motor Truck Co., Pittsburgh, Pa.
 Lansden—¾, 1, 2, 3½, 5, 6—Lansden Company, Danbury, Conn.
 ★Indicates Advertisers. See Advertisers' Index.
 Larrabee-Deyo—1, 1½, 2½, 3½, 5—Larrabee-Deyo Motor Truck Co., Inc., Binghamton, N. Y.
 Lombard—T.T.—Lombard Auto Tractor Truck Corp., New York, N. Y.
 Luedinghaus—1, 1½, 2—Luedinghaus-Espenschied Wagon Co., St. Louis, Mo.
 Maccar—1½, 2, 3, 4, 5—Maccar Truck Co., Scranton, Pa.
 ★MacDonald—5, 7, 7½—Union Construction Co., San Francisco, Cal.
 Mack—1½, 2, 2½, 3½, 5, 6½, 7½, T.T.—Mack Motors, Inc., New York, N. Y.
 Mason Road King—1—Durant Motors, Inc., Long Island City, N. Y.
 Master—1½, 2, 2½, 3½, 4, 5, T.T.—Master Trucks, Inc., Chicago, Ill.
 Maxwell—1½—Maxwell Motor Co., Inc., Detroit, Mich.
 Menominee—1, 1½, 1½, 2, 3½, 5—Menominee Motor Truck Co., Clintonville, Wis.
 Milburn—Milburn Wagon Co., Toledo, O.
 Moreland—1, 1½, 2, 3, 5—Moreland Motor Truck Co., Burbank, Cal.
 Napoleon—1, 1½—Napoleon Motors Co., Traverse City, Mich.
 Nash—1, 2—Nash Motors Co., Kenosha, Wis.
 Nelson-LeMoon—1, 1½, 2½, 3½, 5—Nelson & LeMoon, Chicago, Ill.
 Netco—2, 2½—New England Truck Co., Fitchburg, Mass.
 Niles—2½—South Main Motor Co., Pittsburgh, Pa.
 Noble—1, 1½, 2, 2½, 3½—Noble Motor Truck Co., Kendallville, Ind.
 O. B.—1, 2, 3, 5—O. B. Electric Vehicles, Inc., Long Island City, N. Y.
 O. K.—1½, 2½, 3½—Oklahoma Auto Mfg. Co., Okay, Okla.
 Ogden—¾, 1½, 2½, 3½, 5—Ogden Truck Co., Chicago, Ill.
 Old Reliable—2½, 3½, 5, 6—Old Reliable Motor Truck Co., Chicago, Ill.
 Oldsmobile—1—Olds Motor Works, Lansing, Mich.
 Olympic—2½—Olympic Motor Truck Co., Tacoma, Wash.
 Oneida—2, 2½, 3½, 5—Oneida Motor Truck Co., Green Bay, Wis.
 Oshkosh—2, 2½—Oshkosh Motor Truck Mfg. Co., Oshkosh, Wis.
 Overland—¾—Willys-Overland Co., Toledo, O.
 Packard—2, 3½, 5—Packard Motor Car Co., Detroit, Mich.
 Paige—1½, 2½, 3½—Paige-Detroit Motor Car Co., Detroit, Mich.
 Parker—1, 1½, 2, 3, 3½, 5—Parker Motor Truck Co., Milwaukee, Wis.
 Patriot—1, 2, 3—Patriot Mfg. Co., Navelock, Neb.
 Penn—2—Penn Motors Corp., Philadelphia, Pa.
 Perfection—¾, 1½, 2, 3—Perfection Truck Co., Minneapolis, Minn.
 ★Pierce-Arrow—2, 3½, 5—Pierce-Arrow Motor Car Co., Buffalo, N. Y.
 Pioneer—1—Pioneer Truck Co., Chicago, Ill.
 Pittsburgher—2, 3, 3½—Pittsburgh Truck Mfg. Co., Pittsburgh, Pa.
 Power—2½, 3½—Power Truck & Tractor Co., St. Louis, Mo.
 Premocar—1½—Preston Motors Corp., Birmingham, Ala.
 Rainer—¾, 1, 1½, 2, 2½, 3½, 5—Rainer Motor Corp., Long Island City, N. Y.
 Reliance—1½, 2½—Appleton Motor Truck Co., Appleton, Wis.
 Reo—1½—Reo Motor Car Co., Lansing, Mich.
 Republic—1, 1½, 1½, 2, 3, 4—Republic Motor Truck Co., Inc., Alma, Mich.
 Reynolds—2, 3—Reynolds Truck Co., Mount Clemens, Mich.
 ★Rowe—1½, 2, 2½, 3, 4, 5—Rowe-Stuart Corp., Lancaster, Pa.
 ★Ruggles—¾, 1½, 2, 2½—Ruggles Motor Truck Co., Saginaw, Mich.
 Rumely—1½—Advance-Rumely Thresher Co., Inc., La Porte, Ind.
 Sandow—1, 1½, 2½, 3½, 5—Moses & Morris Motors Corp., Chicago Heights, Ill.
 Sanford—1, 1½, 2, 2½, 3½, 5—Sanford Motor Truck Co., Syracuse, N. Y.
 ★Schacht—1½, 2, 3, 4, 5, 7—G. A. Schacht Motor Truck Co., Cincinnati, O.
 Schwartz—1, 2, 3, 5—Schwartz Motor Truck Co., Reading, Pa.
 ★Selden—1½, 2½, 3½, 5—Industrial Motor Corp., Rochester, N. Y.
 ★Service—¾, 1½, 1½, 2, 3, 3½, 4—Service Motor Truck Co., Wabash, Ind.
 ★Signal—1, 1½, 2½, 3½, 5—Signal Truck Corp. Detroit, Mich.
 ★Standard—1½, 1½, 2½, 3½, 5—Standard Motor Truck Co., Detroit, Mich.
 Steinmetz—Steinmetz Electric Motor Car Corp., Arlington, Baltimore, Md.
 Sterling—1½, 2, 2½, 3½, 5, 7½—Sterling Motor Truck Co., Milwaukee, Wis.
 ★Stewart—1, 1½, 1½, 2½, 3½—Stewart Motor Corp., Buffalo, N. Y.
 Superior—1, 2, 2½—Superior Motor Truck Co., Atlanta, Ga.
 Super Truck—2½, 5—O'Connell Motor Truck Co., Waukegan, Ill.
 Tiffin—1½, 2½, 3½, 5, 6—Tiffin Wagon Co., Tiffin, Ohio.
 Titan—2½, 3½, 5—Titan Truck Co., Milwaukee, Wis.
 Thormat Speed—1½—Thormat Motor Co., Kent, Ohio.
 Tower—1½, 2½, 3½—Tower Motor Truck Co., Greenville, Mich.
 Traffic—1½, 2, 3—Traffic Motor Truck Corp., St. Louis, Mo.
 ★Transport—1, 1½, 2, 3, 3½, 5—Transport Truck Co., Mt. Pleasant, Mich.
 ★Traylor—1½, 2, 3, 5—Traylor Eng. & Mfg. Co., Cornwells, Pa.
 Triangle—1, 1½, 2, 2½—Triangle Motor Truck Co., St. Johns, Mich.
 Triumph—1½, 2, 2½—Triumph Truck & Tractor Co., Kansas City, Mo.
 Twin City—2, 3½—Minneapolis Steel & Machinery Co., Minneapolis, Minn.
 Ultimate—1½, 2, 2½, 3, 5—Vreeland Motor Co., Inc., Newark, N. J.
 Union—2½, 4—Union Motor Truck Co., Bay City, Mich.
 ★United—1, 1½, 2, 2½, 3½—United Motor Products Co., Grand Rapids, Mich.
 ★U. S.—1½, 1½, 2½, 3, 4, 5—United States Motor Truck Co., Cincinnati, Ohio.
 Velle—1½, 2½—Velle Motors Corp., Moline, Ill.
 Vim—¾—Vim Motor Truck Co., Philadelphia, Pa.
 ★Walker—¾, 1, 2, 3½, 5—Walker Vehicle Co., Chicago, Ill.
 Walker-Johnson—2, 2½—Walker-Johnson Truck Co., Woburn, Mass.
 ★Walter—2, 2½, 5, T.T.—Walter Truck Co., New York, N. Y.
 ★Ward—¾, 1, 2, 3½, 5—Ward Motor Vehicle Co., Mt. Vernon, N. Y.
 Ward La France—2½, 3½, 5—Kalamazoo Motor Corp., Kalamazoo, Mich.
 ★Watson—1, 3½, 5, T.T.—Watson Wagon Co., Canastota, N. Y.
 ★White—¾, 2, 3½, 5—White Co., Cleveland, Ohio.
 Wichita—1, 2, 3, 3½, 5½—Wichita Falls Motors Co., Wichita Falls, Tex.
 Wilcox—1, 1½, 2½, 3½, 5—Wilcox Trux, Inc., Minneapolis, Minn.
 Wilson—1, 1½, 2½, 3½, 5—J. C. Wilson Co., Detroit, Mich.
 Winter & Hirsch—2½, 3½—Winter & Hirsch Motor Truck Co., Chicago, Ill.
 Winther—1, 1½, 2½, 3, 3½, 5, 7—Winther Motor Truck Co., Kenosha, Wis.
 Wisconsin (Sauk City)—1, 1½, 2½, 3½, 5—Wisconsin Farm Tractor Co., Sauk City, Wis.
 Witt-Will—1½, 2, 2½—Witt-Will Co., Inc., Washington, D. C.
 Yellow Cab—¾, 1½—Yellow Cab Mfg. Co., Chicago, Ill.

TRUCK EQUIPMENT AND APPLIANCES

Toledo Standardized Valves

Toledo standardized valves are being offered for replacement purposes. The Toledo Steel Products Co., Toledo, O., plant has a capacity of 22,000 valves daily. Every valve is made complete within the plant. Even the metal is produced in its big modern foundry.

Toledo standardized valves are subject to a careful inspection, each is slushed in a high grade rust preventive and individually wrapped in kraft paper. They are



Standardized Toledo Valve and Manner of Packing

packed 12 to a box in a strong carton attractively printed and bearing the stock number in plain figures. The heads are made of a fine close-grained grey iron. Head and stems are electrically welded entirely through the head, and then annealed. The valves are machined to minute accuracy. They are fully guaranteed.

On the head of each valve is stamped the stock number, which corresponds with that on the box as well as to the alphabetical and numerical lists.

New Holmes Universal Joint

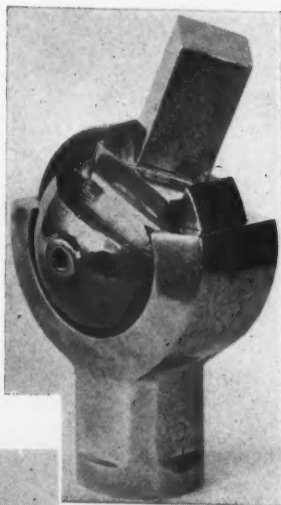
The Holmes Universal Joint Co., 25 Broad St., New York City, announces the production of the Holmes Universal Joint in a special model for the Ford. It is designed in three interlocking parts, as shown in the disassembled view. They comprise the entire assembly of the joint.

Taking each of the three parts from right to left it will be seen that the first right-hand part fits into the middle part, which, in turn, fits into the left-hand part. This universal is constructed in two end-pieces and a center block. The terminal at the left of the illustration is the driven yoke, which receives the end of the driving shaft of the car. The ter-

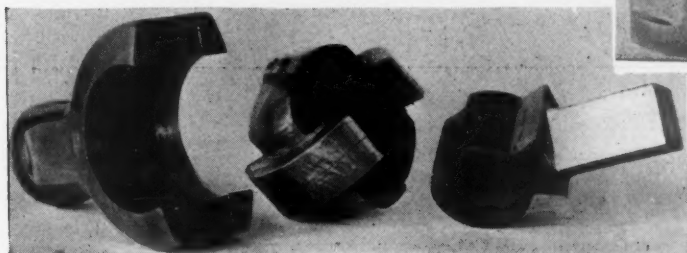
minial at the right is the driving head, entering and engaging the rear of the power unit. These terminals are joined with the center block in a universal joint, which, according to the maker, permits operation under any pressure and against any shock to an extreme angle of 30°.

The two end terminals are drop-forged from alloy steel of high tensile strength and are properly machined and then heat-treated to raise further their torsional resistance. They are accurately machined within very close-fitting limits. The center block is a die-casting of a special manganese bronze, having ninety thousand lb. tensile strength. The die is cast within two one-thousandth parts of an inch limit between all meeting surfaces of terminals and center block. The Holmes Universal is operated within a compact, grease-tight housing. In assembling, the center block fits very closely within the machined groove of the driven yoke and the driving head fits precisely within the central chamber of the center block.

It is said that these parts can be assembled or disassembled on a clearance which is obtained only at such an extreme angle that there is no possibility of the parts being pulled away from one another in service. Interlocking of these parts has been designed so that the surfaces which meet under pressure have sufficient breadth to withstand any load strain or road shock of the heaviest vehicles. It is expected that this joint will be manufactured later in models for other makes of cars. The only model now being marketed is the special model for the Ford.



Disassembled and Assembled Views of the New Holmes Universal Joint.



Paulson Universal Jack

The Paulson universal jack facilitates the job of elevating or lowering. This is due to its long, strong, tool finish extension arm, which permits the operator to stand in an erect position when operating the jack. Its double-lift feature gives a maximum height of 18 in. Its minimum height is 8½ in. This jack,



This Jack Permits Ready Positioning and Accessibility

made by the Paulson-McPike Co., 1334 E. 55th St., Cleveland, O., has a capacity of 3000 lb., is ball bearing equipped, operates in oil and is adaptable to all vehicles. Price, \$5.50.

Powerlite Non-Battery Flashlight

The Power Light Flashlight Co., Cleveland, O., is marketing what is possibly the smallest real electrical generator in practical use. In addition to the ingenious generating magneto, the rest of the construction of this new flashlight is unique and interesting.

The mechanism is contained in a "pistol grip" aluminum case that just fits the hand. The fingers of the hand grip a broad lever or trigger which is geared to the magneto in such a way that when the trigger is pulled the magneto revolves rapidly and a bright light appears instantly in the bulb. This flashlight is a French development.



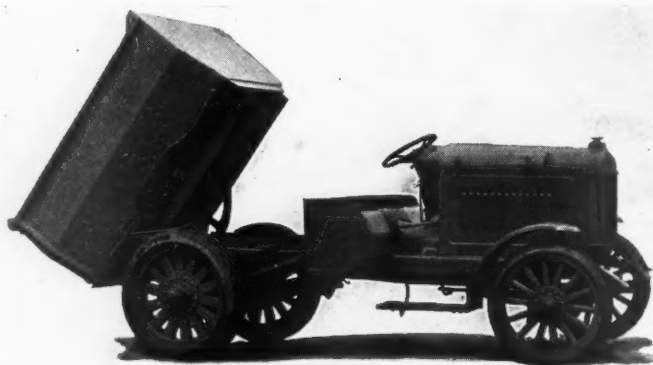
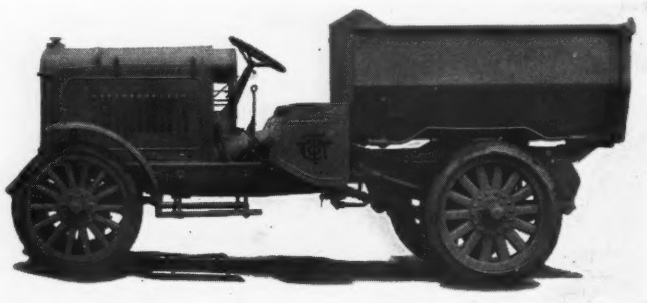
This Flashlight Generates Its Own Power

Toppins' Tractor Truck

WITH Toppins' Tractor Truck, recently introduced by the Toppins Tractor Truck Co., Brown- ing Building, Milwaukee, Wis., a new field for Fordson tractors is opened. In fact, it is pointed out, the Toppins' unit will fill a rather long want with the farmer and tractor owner, for the reason that the farmer can use his tractor when plowing, during which period he has no

Tires, Front—34 x 4 in.
Tires, Rear—36 x 7 in.
Wheels, Front—34 x 2 1/4 in.—14 Spokes.
Wheels, Rear—36 x 2 1/2 in.—14 Spokes.
Frame, 6 in.—1/4 in. Stock—33 in. Wide.
Springs, Front—40 x 2 1/2 in. Wide—1/4 in. Stock.
Springs, Rear—52 x 3 in. Wide—13—5/16 in. Leaves.
Front Axle—Drop Forged, 4 3/4 in. I-Beam.

Toppins' Model R, Chain-Driven, 109-in. Wheel- base, Two to Two and a Half Ton Tractor Truck.



Another View of the Chain-Driven Model With Body in Discharging Position.

Toppins' models are featured by the utilization of Fordson engines, which are readily transferable from tractor to truck or vice versa.

use for a truck, and later use the tractor's power-plant in the Toppins' unit as a truck when he has no need for the tractor. It makes an ideal combination for the farmers' requirements. The transfer can be brought about by any common hoisting device, simply and quickly.

Owing to an extremely large reduction on low, this truck unit provides a surplus of power and will work continuously under heavy load in intermediate gear. The makers of the unit also claim that by harnessing the tractor in its unit the power plant is mounted on springs which eliminates vibration to a minimum, and where power is required from the power plant the maximum is developed by the pay load giving the traction required to the driving wheels. It is also said that traveling at a higher rate of speed, in high gear, gives better cooling efficiency, and that belt driven machinery can be mounted on the chassis.

The Toppins' Tractor Truck units are produced in two models, the model J, which is a 140-in wheelbase, worm driven job of from 2 to 2 1/2 tons capacity, and the model R, which is a 109-in. wheel- base chain driven job of 2 1/2 tons capacity.

Specifications of the 2 1/2 ton worm drive job follow:

Wheelbase—140 in.
Tread, Front—57 in.
Tread, Rear—57 1/2 in.

Rear Axle—Wisconsin Heavy Duty Worm Axle.
Service Brakes—17 in. in Diameter, 2 1/2 in. Wide.
Emergency Brakes—12 1/4 in. in Diameter, 2 1/2 in. Wide.
Length of Frame to Center of Rear Axle—64 in.
Ratio—7 1/4 to 1.
Weight of Chassis—4,500 lb.



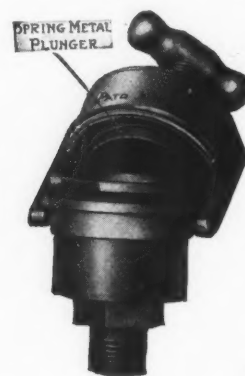
Flange-Wheeled Motor Truck Adds New Life to Small Railroad

Citizens of Ava, Mo., realizing that the very life of the city depended on adequate freight transportation, bought the Ozark Southern Railway, which recently suspended freight deliveries, and then asked the International Harvester Co. of America to provide something in the way of a motor truck for rail operation that would give continuous service at low cost per ton mile. A Model 61 International truck, redesigned to operate under the unusual track conditions prevailing was built, and is proving a big success in every way.

New Davis Grease Cup

The Davis Lubricating Co., 1430 Van Ness Ave., San Francisco, Cal., announces that it is now in production on the Davis grease cup for outside bearings. Its outstanding feature is a patented thin spring metal plunger, slightly concave like a shallow saucer. This plunger exerts a firm, uniform pressure against the sides of the barrel, making the cup dust-proof, leak-proof, grease-tight and oil-tight. Thus the cup may be installed upright with L nipples so that oil or grease may be used under great pressure.

Its ability to hold the grease under pressure long after the car is in motion, forces grease into the bearings more efficiently, according to the manufacturer. The Davis grease cup is easy to fill, as the breech lock top fastening opens and closes it instantly with a slight turn. It



New Davis Grease Cup for Outside Bearings

has no threads to re-enter or cross and no detachable parts to drop in the dirt. A turn of the plunger with the fingers exerts hundreds of pounds of pressure, which, it is specified, will open mostly any bearing. About 12 refillings is sufficient for the average car, as there is no waste of grease. It is mentioned that on water pumps it will hold the water, even though there is no grease in the cup.



The Faith of Ruggles Dealers Now Reaps Reward

Many of the present large group of dealers joined us before Ruggles Trucks were in use and before their worth was demonstrated by the tests of actual service that have since taken place.

They had faith in the business policies of this company. They believed with us that a high quality truck sold on a quantity production basis, at a price that made it the *world's greatest truck value*, MUST win through.

This faith is rewarded. Ruggles dealers are dominating their territories. New dealers are seeking franchises. Sales are constantly increasing. The business world has welcomed this national system of transportation economy. We do not believe there is a Ruggles dealer today who would willingly surrender his franchise.

Ruggles Trucks listing at \$795 to \$2195 (chassis) are the greatest value ever offered in the history of the industry. Their price, quality and dependability give them sales possibilities that inevitably mean big income for any aggressive dealer who will take advantage of the opportunity.

*Write or wire us for descriptive literature
and details of the Ruggles franchise*

RUGGLES MOTOR TRUCK COMPANY
SAGINAW, MICHIGAN

Canadian Factory: Ruggles Motor Truck Co., Ltd., London, Ontario

RUGGLES TRUCKS

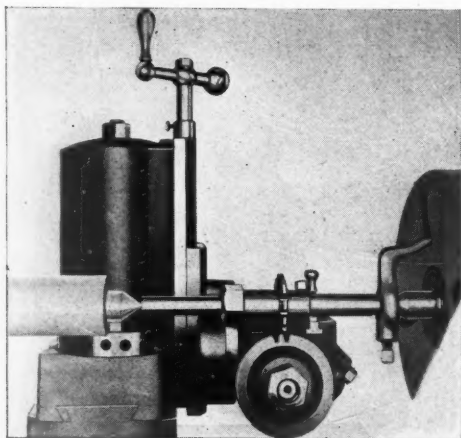
The World's Greatest Truck Value

Service Station and Repair Shop Appliances

Williams Cylinder Grinder

The Williams cylinder grinder grinds the cylinders vertically. The head is a unit casting with double motor drive, transmission automatic reversing mechanism, feed and speed changes and grinding arbor. This unit casting contains all working parts, which are kept at all times in alignment and thoroughly lubricated by an oil bath, oil vapor and oilers.

At the will of the operator it travels up and down a heavy double column on



For Grinding Cylinders Vertically

ways of liberal dimensions, counter balanced by weights in each column. The grinding arbor is driven by bevel gears and rotates at constant speed from 5000 to 7000 r.p.m. on large bronze double-row annular bearings adjustable for wear, which carry the weight of the shaft and take care of thrust load.

The dialing mechanism for adjusting eccentrics is simple and easy to read, allowing the operator to know at all times the size he is grinding. The universal table permits quick set-up work and is readily cranked in and out and crossways for centering work. It occupies floor space 37 x 42 in. The grinder is offered by the Hy-Way Service Co., 225 S. St. Joseph St., South Bend, Ind.

Perfection Connecting Rod Fixture

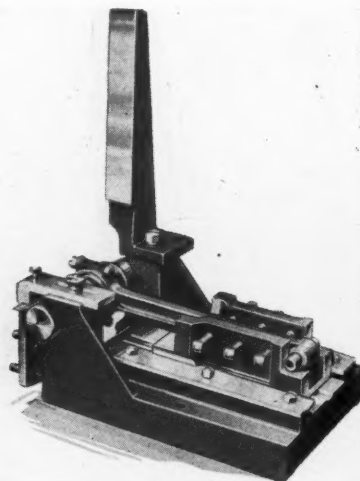
The Perfection connecting rod testing and straightening fixture offered by the Perfection Tool Works, 209 Liberty St., Jackson, Mich., is designed and built to test and straighten connecting rods of any car or truck. It checks the rod for three positions and includes a piston aligning attachment for checking cross bore of the piston.

The connecting rod is fitted on the mandrel, the clamps and adjusting screws set and the rod placed in the testing slide. This slide is provided with three screws on each side for straightening purposes.

If the rod is found to be sprung it is easily straightened without taking it from

the fixture. The finished surface of the testing slide is ground parallel to the mandrel and is adjustable to a connecting rod of any car. All mandrels are ground to various sizes of connecting rod bearings.

Price, \$50, including two mandrels. Extra mandrels, \$1.50 each.



Showing How the Rod is Mounted for Test

Clark Piston Regroover

The Clark Regroover offered by the Clark Tool Works, Inc., Belmont, N. Y., is claimed to regroove pistons in from three to four minutes each. It is said to be instantly adjustable to any size, including a 4 1/4-in. piston, is entirely automatic and cleans up both edges of the grooves to .015 in. above standard width.

The three guides which fit into the groove are regulated by a handle moving the top plate, and are locked in place by three thumb screws. The cutting tool is moved up to the edge of the groove by a knurled adjusting nut, and the tool is advanced (.010-in. per revolution) by the handle as the Regroover is revolved around the piston. When the cutting tool strikes the bottom of the groove, it can be quickly released and returned to position for the next groove by merely removing the handle.

A special device is furnished for holding the pistons in a vise. Also guides and tools are supplied to take care of all standard pistons. The entire outfit comes packed in an oak case and sells for \$40 east of the Rockies.

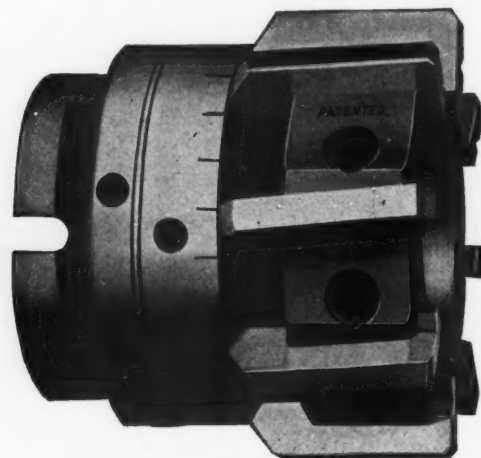


Clark Adjustable Piston Regroover

Wetmore Expanding Cylinder Reamer

The Wetmore expanding cylinder reamer for semi-finishing is particularly adapted to the reboring of Ford and Fordson engine blocks.

It has left-hand angle cutting blades, the same as in the Wetmore standard expanding reamers, thereby eliminating liability of "digging in" and chattering. Free cutting, a straight, round hole with no scoring when backing out after the cut



Wetmore Expanding Reamer for Semi-Finishing

is said to result with the use of this tool.

Adjustments of .001 in. by means of a graduated micrometer cone nut at the rear of the blades are rapidly and accurately made on this reamer. The entire tool is of special heat-treated alloy steel, and the arbors are hardened and ground. It is made by the Wetmore Reamer Co., Milwaukee, Wis.

Ohio Battery Charger

To obviate the need of treking batteries to a charging station and eliminate the expense of this manner of recharging the Ohio Electric & Controller Co., Cleveland, O., is offering a comparatively silent, ample capacity charger. It will charge at any desired rate from 1 to 20 amperes, and is claimed to run without attention, has no parts subject to breakage or deterioration and will last a lifetime.

This motor generator set consists of a ball-bearing Ohio low voltage generator and Ohio motor wound for any of the usual A. C. current standards.

The motor and generator are connected by flexible coupling. There is an ammeter and rheostat to regulate the charging rate. The motor has ten foot cord with attachment plug and the generator has six foot leads with convenient spring terminal clips. Directions are simple and no mistake is possible in connecting to battery.

rolled steel *is the ideal material for truck wheels*



BETHLEHEM WHEELS add to the serviceability and economy of the finest truck. They possess tremendous strength. They are amply strong to carry a truck through a long, busy life—yet they are light enough and resilient enough to reduce wear and tear and lessen repair bills. Bethlehem Wheels are made of rolled steel—from a special Bethlehem rolled I-beam. This rolled steel construction is the chief factor behind the satisfactory results Bethlehem Wheels are giving under the severest conditions of everyday service.

BETHLEHEM STEEL COMPANY BETHLEHEM, PA.

Sales Offices:

New York	Boston	Philadelphia	Baltimore	Washington
Atlanta	Buffalo	Pittsburgh	Cincinnati	Cleveland
Detroit	Chicago	St. Louis	San Francisco	

BETHLEHEM

ROLLED STEEL TRUCK WHEELS

⌘ THIS SYMBOL IN ANY ADVERTISEMENT MEANS: SEE "CHILTON AUTOMOBILE DIRECTORY" FOR COMPLETE BUYING INFORMATION ⌘

Know Where You're at by Checking up on Yourself

(Continued from page 49)

it will make a good impression upon all of the people to whom it is presented?

Is your data on gasoline consumption, oil consumption, maintenance costs, etc., on the trucks of local purchasers in handy easily understandable condition and is all this data right up to date or is some of it rather out of date?

Is your list of present users of your trucks accurate and is it in such shape that you can hand it over to a prospect

and let him see for himself just how many local people are finding it satisfactory and profitable to use your trucks?

Do you make the best possible use of all the literature which is furnished by manufacturers and distributors for the purpose of helping you sell trucks?

Check up on yourself right now by rating yourself in the manner suggested above and by asking yourself all of the questions indicated in the above paragraphs.

Know where you're at and why and where you're going and why and **HOW YOU'RE GOING TO GET THERE.**

Do this NOW.

A Diamond T Transformed Into a Portable Fortress

The accompanying illustration is of a 2½-ton Diamond T truck. It is used by the Guarantee Service Company of St. Louis, Missouri, which concern makes a business of hauling large sums of money and securities to various parts of the city and suburbs. Banks and concerns with large pay rolls are their chief customers.

The body was built by the Rogers-Schmidt Steel Co., St. Louis, Mo., and is constructed of bullet-proof steel plate. In the rear of the body is a burglar-proof safe with combination locks identical to those found in office safes. The door of the body proper is built with a combination safe lock and can be opened only by the combined efforts of those inside and outside of the truck.

An exceptionally interesting feature of truck control is embodied in this chassis. Should the driver be in league with bandits and attempt to drive the truck with its precious load to some quiet country road where a robbery could easily be committed, the occupants may stop the truck entirely. There are duplicate brakes in the body and when these are applied ignition is automatically cut off. The feature also prevents disastrous collisions in the event that the driver is shot and should lose control of his machine. The chauffeur's cab is, of course, entirely separate from the rest of the body, being connected only by a speaking tube. No

person may enter the cab without the chauffeur's consent.

One feature which works out to an advantage is a drop door at the rear of the body which forms a shelf as it is lowered so that pay rolls can be paid directly to the man at mines or factories without removing the money from the car and without the guards having to leave their compartment. All steps fold automatically as the doors are closed.

Heating facilities for cold weather and two electric fans for warm weather are included in the equipment so that the compartment is always comfortable for its occupants.

At all times there are three guards with this vehicle who are trained in rifle and revolver use, being required to engage in practice once a week. All are experts and with this exceptional hazard, hold-up men will probably never be tempted to rob.

One Million a Day for the Acceptance Corporation

The General Motors Acceptance Corp. is setting a goal at "Getting the Habit of Over \$1,000,000 a Day." On April 18th the Acceptance Corporation had financed \$68,098,000 volume of business during 1923 to date, exclusive of the London (England) Branch. G. M. A. C. has gone over the million-a-day mark eleven times this year. The largest financing of General Motors products for one day was on April 9th—\$1,261,000.

Statement of Ownership, Management, Circulation, Etc.

Required by Act of Congress of August 24, 1912
Of COMMERCIAL CAR JOURNAL,
published monthly at Phila., Pa.
for April 1, 1923

State of Pennsylvania
County of Philadelphia, ss.:

Before me, a Notary Public in and for the state and county aforesaid, personally appeared James Artman, who, having been duly sworn according to law, deposes and says that he is the Editor of the COMMERCIAL CAR JOURNAL, and that the following is, to the best of his knowledge and belief, a true statement of the ownership, management, etc., of the aforesaid publication, for the date shown in the above caption, required by the Act of August 24, 1912, embodied in section 443, Postal Laws and Regulations, printed on the reverse of this form, to wit:

1. That the names and addresses of the publisher, editor, managing editor and business manager are:
Publisher, CHILTON COMPANY, 49th and Market Sts., Philadelphia, Pa.
Editor, James Artman, 4538 Chestnut St., Philadelphia, Pa.
Managing Editor, Albert G. Metz, So. Ardmore, Pa.
Business Manager, C. A. Musselman, Merion, Pa.
2. That the owners are:
James Artman, 4538 Chestnut St., Philadelphia, Pa.
George H. Buzby, Wellington Apartments, 19th and Walnut Sts., Philadelphia, Pa.
C. A. Musselman, Merion, Pa.
A. H. Vaux, Penllyn, Pa.
3. That the known bondholders, mortgagees, and other security holders owning or holding 1 per cent or more of total amount of bonds, mortgages, or other securities are: None.
4. That the two paragraphs next above, giving the names of the owners, stockholders, and security holders, if any, contain not only the list of stockholders and security holders as they appear upon the books of the company, but also, in cases where the stockholders or security holder appears upon the books of the company as trustee or in any other fiduciary relation, the name of the person or corporation for whom such trustee is acting, is given; also that the said two paragraphs contain statements embracing affiant's full knowledge and belief as to the circumstances and conditions under which stockholders and security holders, who do not appear upon the books of the company as trustees, hold stock and securities in a capacity other than that of a bona fide owner; and that this affiant has no reason to believe that any other person, association or corporation has any interest direct or indirect in the said stock, bonds, or other securities than as so stated by him.

JAMES ARTMAN, Editor.
Sworn and subscribed before me this 21st day of March, 1923.

(Seal) HARRY SMITH.
(My commission expires March 7, 1925.)



Diamond T Two and a Half Ton Chassis Transformed Into a Road Bank

Pierce-Arrow Service Men to Hold Convention

The Pierce-Arrow Motor Car Co. of Buffalo, N. Y., recognizing the many advantages to be gained by having members of their distributors service organizations gather at the factory for general conference, have completed plans for a Mechanical meeting to be held May 21 and 22, 1923. Meetings of this kind have been very successful in the past, having been attended by representatives from every Pierce-Arrow Distributors organization.

The Service Department, of which F. J. Wells is manager, has arranged a very interesting program comprising the presentation of papers and discussions bearing upon the Company's current cars and trucks and other subjects vital to service.



Easy Steering on All Roads

This new Ross cam and lever steering gear embodies such a high appreciation of the possibilities of steering gear efficiency, that it has made an instantaneous appeal to everyone who manufactures or drives a motor car.

In mid-position, it is so irreversible that practically all road shock is eliminated. The long lever arm inside the gear provides the easiest kind of steering under all conditions and the car holds the road with the least effort on the part of the driver.

It combines small size and simple construction with a maximum of power, reliability and service. The variable pitch of the cam, increasing rapidly toward either extreme, develops a unique accelerated action which facilitates quick control in handling the car.

Every manufacturer owes it to himself and his trade to investigate the superior steering efficiency of this new gear. We will be glad to furnish any information desired.

ROSS GEAR & TOOL COMPANY
760 Heath St. Lafayette, Indiana, U.S.A.

Steering Gears
for
Passenger Cars
Motor Buses
Motor Trucks
Fire Trucks
and
Tractors

ROSS STEERING GEARS

POWER ~ SAFETY ~ RELIABILITY ~ and EASY STEERING

Ⓜ THIS SYMBOL IN ANY ADVERTISEMENT MEANS: SEE "CHILTON Ⓜ
AUTOMOBILE DIRECTORY" FOR COMPLETE BUYING INFORMATION Ⓜ

Vehicles for Street Railway Service

(Continued from page 48)

With the coming of a very general application of automotive equipment to public transportation, particularly in the hands of existing railway organizations, the reason for the existence and employment of electric transmission equipments is materially changed. The electric street railway organizations being in effect electric transportation engineering institutions should be more inclined to prefer electrical equipment than mechanical. One important phase of the case should be emphasized in this consideration, which is, that in electric transportation organizations competent care and maintenance for the particular features of these equipments is more readily available than anywhere else. Another is that all of the electrical equipment necessary is available from the same large manufacturing organizations which have been the sources upon which railways have depended for their equipment required in the past. As in the case of the trolley bus this specific type of machine is not recommended as a "cure-all" to meet every requirement, but its importance is now accentuated more than ever before.

Body and Chassis Requirements

Body and chassis requirements peculiar to mass transportation is a subject which, from the standpoint of the designer and the manufacturer, has not yet received much consideration, or, at least, it has been sidetracked by the necessity of making use of material and equipment designed for other purposes, but constituting the only kind immediately available for application to motor bus construction. Manufacturers dependent upon other lines of business as their main source of revenue are not easily deflected into a new channel where the prospect is indefinite, the demand intermittent and the varying operating requirements necessitating many changes from their standardized products. Naturally, therefore, what they have produced has been furnished with hesitancy and loaded down with handicaps. Some few manufacturers have made changes in their equipment as far as might reasonably be expected, with the purpose of encouraging development in this "new business" line, but on the other hand many manufacturers have refused to depart from their standard products, leaving the responsibility of any misapplication made resting upon their agents. The agent on the other hand being forced to maintain his existence under trying business conditions which have prevailed, particularly in the motor truck field in recent years has in many cases been desperate to make use of any business opportunity presented and "none being so liberal as the desperate" they have conishing touches of the painter and decorator in attempts to produce compromise vehicles built upon truck chassis. In most instances these makeshifts have been heinous violations of the designers' art, as we know it from an engineering standpoint, and in a few years from now when

rational advance has been made in proper design these machines will be held up to us as horrible examples of our earlier ignorance and incompetence.

Is it any wonder then that we find the conservatively trained executives in public passenger transportation fields in such an attitude of reluctance to adopt this misfit equipment which violates from every point of consideration the tradition of their industry as developed by years of experience? We should acknowledge immediately the radical difference existing between their experience and ours as automotive engineers. We are principally concerned with the design, manufacture and application of isolated unit vehicles where, in the passenger car direction, speed, luxury and comfort is an ultimate attainment, and in the commercial direction the standardized production of merchandise vehicles which would operate with tolerable satisfaction under a great variety of service conditions. The street railway engineer and executive on the other hand have been required to provide the continuous performance of a rigidly standardized transportation under conditions where failure and interruption is not tolerated and the good will of large communities of patrons must be catered to and often complied with under trying conditions, and where "safety first" has even been more vital than continuity of operation.

Permanency of Public Service Transportation Organizations

Solidity and permanency of organization has been absolutely necessary and many obligations of a municipal, political and regulatory nature have had to be compiled with as requirements to legal or actual existence. Therefore, we should feel pretty sure the assumption, that the apparent temporary success of independent operators forebodes displacement of the more permanent railway organization service, is entirely delusive and that within the lapse of a short period these organizations will seriously determine upon a rational program for graduated advance in directions of the newly demanded service.

The problem of developing satisfactory equipment is not readily solved and it demands a serious study, both on the part of the railway engineer and the automotive engineer. The nature of the undertaking should impress us with its serious importance, and definite steps are warranted in recognition of the enormous progressive possibilities opened up to both the automotive industry and the railway industry in meeting new expansion in directions that have not been previously contemplated by either of these industries.

Prospective Business for Street Railways

It requires no stretch of the imagination to realize what may be accomplished if these well-founded and experienced transportation organizations should, by the collaborating influence of the automobile industry and the consequent employment of flexible vehicles, be suddenly released from the rail and wire restrictions which have definitely limited their

operations to almost a single field of service. With flexible vehicles operated to a large extent under the advantages of central station power and distribution, new fields of business development are immediately opened up. Their city passenger transportation can be materially augmented with very much less investment requirement than similar expansions previously called for. Sightseeing transportation is legitimately within their business province; summer touring service is a prospective possibility, but more important than these is the opportunity to handle the local transportation of merchandise, parcel post and express, as well as local freight transfer for merchants and manufacturers, and the possibility of collaborating with the railroads in putting into execution the recently much talked of store door delivery service. Such operations may require changes in the limitations of their existing franchises, but these changes or enlargements should be readily secured in view of the advantages rendered to their communities by the increased transportation facilities afforded. Their ability to supply a highly organized, economic and varied line of service to the business interests in their immediate vicinities should certainly fortify them in demanding the rights necessary to conduct these progressive and improved operations.

Heretofore, the transportation of freight by street railway equipment has not been very general in this country, nevertheless the possibilities for business in this direction are so extensive as to warrant the energetic action required to bring it into common practice. Necessity—"the mother of invention"—in developing the ways and means to accomplish this, may have been lacking in the past, but in the light of necessities which have existed in Europe we have some good examples of what can be done under pressure. In the Electric Railway Review, May 22, 1920, under the title "Teuton Trolleys Handle Freight," it is shown that in Germany as long ago as 1903 sixty of the 148 street railways then in use were handling freight. In 1913 sixty of the Prussian street railways and nineteen of the railways in other German States were handling freight with 2600 cars for package mail and freight, of which 964 were regular freight cars of six metric tons each in capacity. In Vienna, Austria, up to 1918 local street railways had made 110,000 car trips; the equivalent of 310,000 wagon trips. For the same amount of work 350 horse trucks or 100 motor trucks would have been needed.

Therefore, the attitude of these railway organizations instead of being that of resistance and reluctance towards the use of automotive equipment should rather be a complete and energetic change to a realization of the enormous new business fields opened up to them to invigorate their organizations and re-establish a happier financial condition, by seizing upon this basis of a new start with added fields for progressive development.

Flexible Equipment Requirements

Having indicated the several directions of possible expansion, we may return

Russel

MASTER OF ROAD AND LOAD

TRUCK AXLES

The approval of *Charles P. Steinmetz* on anything electrical carries convincing weight; for his endorsement of the finished product gives the buyer a justified confidence that it is as near perfection as it is humanly possible to make it.

In a vehicle driven from storage batteries, it is imperative that the energy be made available with the minimum loss; that the me-

chanical efficiency—as well as the electrical efficiency—be as near 100% as possible.



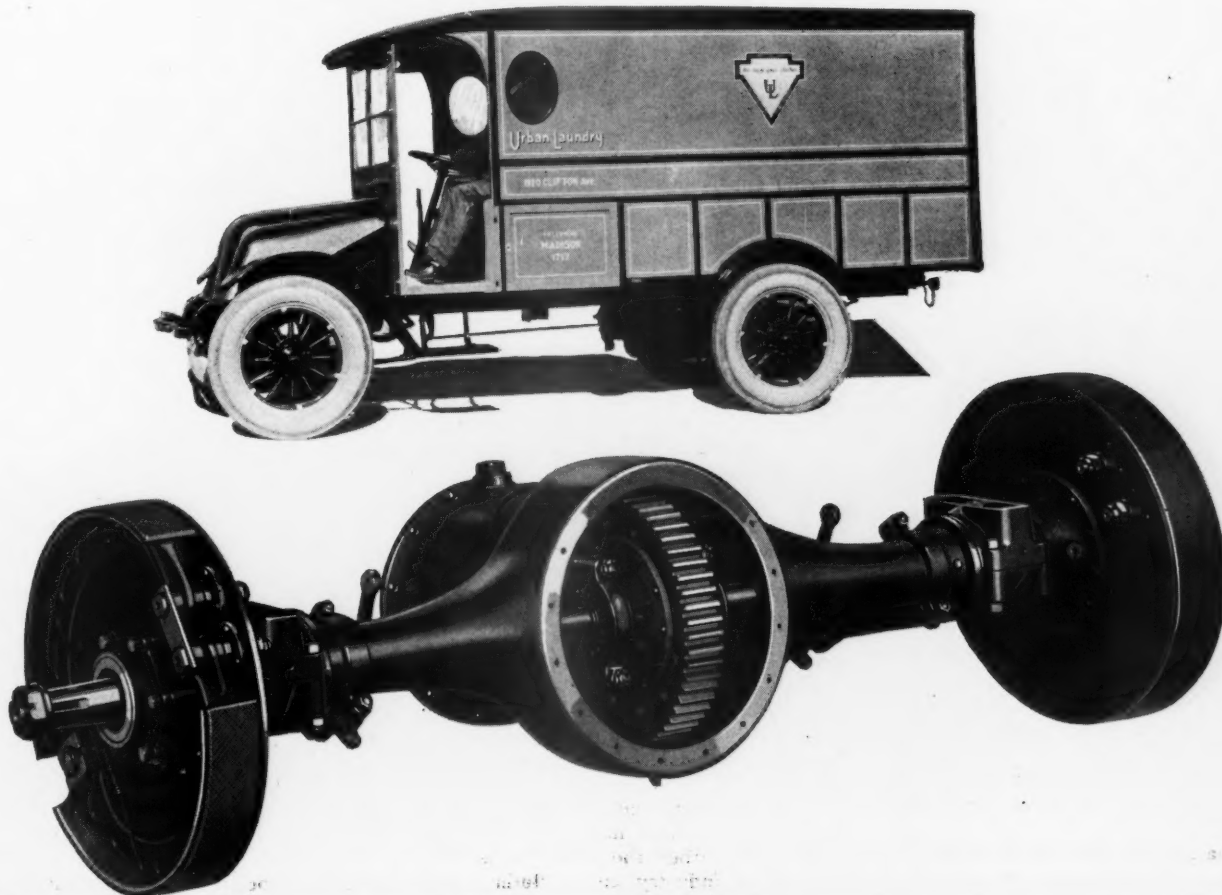
It was natural, therefore, that *Steinmetz* should come to *Russel* for the driving axle; for experience has shown that in no other type of drive is the efficiency so high under all conditions as in *Russel* Double Reduction Axles.

RUSSEL MOTOR AXLE COMPANY

Division of McCord Mfg. Co.

DETROIT

MICHIGAN



again to the body and chassis equipment necessary to meet these several new requirements. In seeking a solution of this new equipment problem we must presuppose a favorable attitude towards new methods to be adopted necessarily requiring trial periods to actually insure the performance required and to safeguard the investments to be made for such new equipment. Demand principally exists for large carrying capacity with low operation cost and one man control. Other features sought are:

Low center of gravity.

Low floor.

Large seats.

Wide aisles.

Compensating spring suspension.

Accessibility for maintenance and repair.

In operation there is need for smooth acceleration, ample power, adequate brakes and permanency of the power plant under continuous operation.

Desirable additions in equipment features are:

Detachability of power plant.

Season body changes.

A fundamental necessity is:

Interchangeability of parts and standardization of the units employed.

These requirements cannot be readily supplied in machines designed primarily as trucks. Their special service requirements demand correspondingly special designs.

Motor omnibuses in European cities are good examples of specialized development. These are not, however, generally recognized as offering a broad solution for American transportation requirements. In congested metropolitan zones they are particularly applicable, but under average American city conditions something less cumbersome is desirable. To provide for a large passenger capacity longer vehicles of the single deck type are in demand. This calls for increased distribution of axle carrying capacity. Some special developments have been provided having double rear axles, some others have provided two rear and two front axles.

A combination tractor and trailer design is not entirely new in passenger transportation, and it certainly has many advantages worth considering. This type of design will provide the following features:

Three axles for load distribution of passengers and power plant.

Three sets of springs for flexible suspension.

Steering on all six wheels resulting in short turning radius.

Brake equipment application to two axles as well as drive shaft.

Power plant equipment confined to tractor part and consequent freedom from power equipment apparatus in trailer passenger section.

This allows of wide, low hung body, comfortably accommodating both seated and standing passenger.

Pneumatic tire equipment is made serviceable, reducing unsprung wheel weights and operation cost.

Tractor may be detached from trailer

section for ease of repair and maintenance.

Trailer bodies of open and closed types may be interchanged.

In case of accidental damage only one part of equipment put out of service.

Carrying capacity up to 100 passengers may be provided for within reasonable vehicle length.

With such brief summary of this particular design it will be readily seen that in meeting the demands for larger passenger capacity than is usually supplied by the normal 4-wheel vehicle there is opportunity to extend the load space and distribute its weight on a rational basis. Extending the length of vehicles usually handicaps their turning ability, but with three axles disposed along the length of the vehicle and all of them performing turning functions, controlled or governed in a specific manner any reasonable turning radius as well as the exact tracking required for city operation can be attained. The consequence of all these features is that an approach is made to meet the demand which the street railway executive asserts exists in the necessity for handling a large number of people comfortably and flexibly with one man control.

This type of vehicle having included in its power operating equipment the combinations necessary to utilize central station power, or to operate independently, is a step in the direction of least departure from existing practice in street railway organizations; it provides for utilization of the cheap power which they are equipped to furnish and fundamentally tends towards preservation of their existing property and investment with a marked extension in the radius of application of the transportation service in new and profitable directions.

A somewhat similar application of tractor and trailer equipment for freight haulage and package transfer would similarly extend the earning power of these corporations to a marked degree. It is easy to realize that with the co-operative agreements necessary a tractor of the railway company having dual power equipment could transport the loaded trailers of merchants and manufacturers between the various points within the operating zone with the utilization of central station energy for a large part of the performance. Where permanent co-operating relationships could be established by railways and railroads for the conduct of store door delivery between the railroads and their customers, flexible operating equipment and adequate line facilities would be justified, even if the latter involved considerable investment in permanent overhead structures within the zones of greatest traffic such transportation would bring to the railway organization substantial and permanent revenue for operations well within their scope and entirely justified by reciprocal economic advantages.

With problems such as these existing in directions which have not heretofore existed for either the street railway or automotive industry and including both business and engineering opportunities, there should arise immediately a progres-

sive, energetic response in joint co-operation to meet the purposes of both parties. The field for expansive activity is enormous and the automotive industry should immediately recognize that in the street railway organizations, taken collectively, there exists a greater potential group consumer for its products than has ever existed in any single direction. In other words, here we find what may be practically regarded as a unit group of customers experienced as no others have been in the utilization of transportation equipment with requirements which are uniform in character, and the executives and engineers of which are particularly qualified to co-ordinate with the engineers and executives of their own industry.

Committee Working on Standardized Traffic Signals

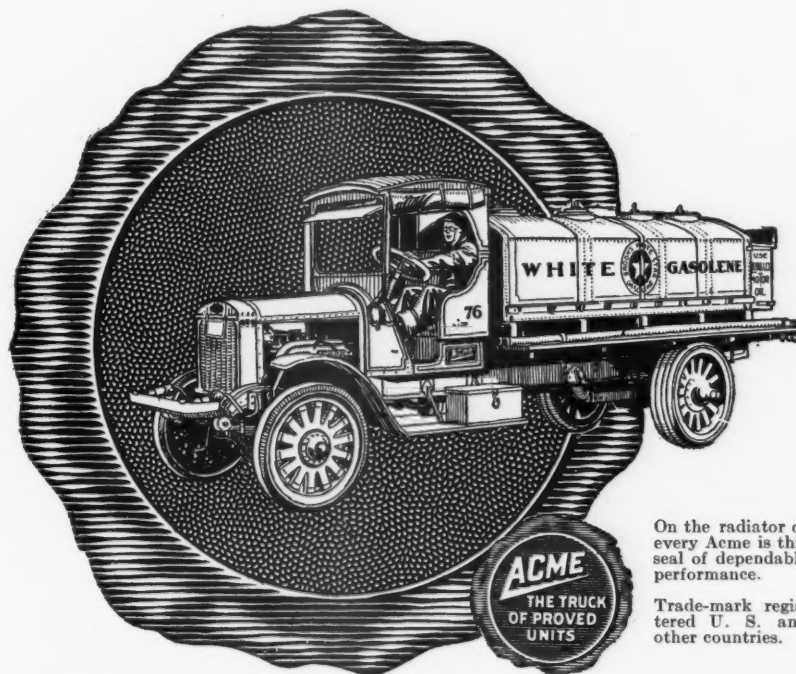
Forty-two men, representing the manufacturers and users of traffic signals, federal and state governmental departments, associations interested in the prevention of traffic accidents, and representatives of the general public, are now at work on the drafting of a national code on the proper colors for traffic signals which, it is expected, will not only cut down the annual loss of life through traffic accidents, but will eliminate many of the existing irritations to motorists and to the operators of steam and electric railways.

This work is being carried on under the auspices of the American Engineering Standards Committee whose approval of a code or standard insures its ultimate acceptance and observance throughout the country. The American Engineering Standards Committee is composed of seven departments of the U. S. Government, the principal technical, industrial and engineering societies and individual business concerns interested in standardization.

The sectional committee drafting this code is made up of seven representatives of the manufacturers of traffic signals, nine representatives of the purchasers of such equipment, three representatives of the users of traffic signals, twelve representatives of governmental bodies, five technical specialists, and six insurance representatives.

The other members of the sectional committee responsible for the development of a code which will wipe out all existing conflicts of traffic signals, and the organizations which they represent, follow:

The automobile industry is represented by the following associations and their delegates: American Automobile Association, David Beecroft; Conference of Motor Vehicle Administrators, Robbins B. Stoeckel; Motor & Accessory Manufacturers Association, M. L. Heminway; Motor Truck Association of America, Inc., T. D. Pratt; Motor Vehicle Conference Committee, Harry Meixell, Jr.; National Automobile Chamber of Commerce, Pyke Johnson; National Highway Traffic Association, Arthur H. Blanchard; Society of Automotive Engineers, W. A. McKay.

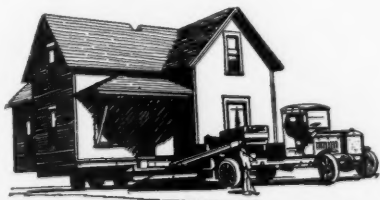


On the radiator of every Acme is this seal of dependable performance.

Trade-mark registered U. S. and other countries.

Dealers praise the **ACME** Franchise

**Learn about
this great
business
opportunity**



Entire Town Moved by Acme Truck

Over 100 houses, 25 to 40 tons each, were moved 12 miles, from Jennings, Michigan, to Cadillac, by an Acme Truck and Trailer, Acme designed and built.

Present Acme dealers know through experience that the Acme Franchise is one of their best business assets; that it provides for perfect team-work between maker and dealer, pledges full co-operation in finding prospects, closing, financing and giving after-sale service that means prestige, profit and business growth.

If your territory is still open, write us for information about the Acme Exclusive Selling Franchise. It offers remarkable money-making opportunities for responsible business men.

This Specialized Truck of Proved Units and Proved Acme Construction is an easy, steady seller. Its superiority and dependability are daily demonstrated in every section. Let us send you proof in the words of present dealers and owners.

Ten models, from speed truck to one with load capacity of 12,500 pounds. Write now about the franchise.

Acme Motor Truck Co., 531 Mitchell St., Cadillac, Mich.

Cleveland Transportation Meeting Best S. A. E. Ever Held

Motor Bus the Subject of Much Discussion. Most Subjects Were Dealt With From the Business Side Rather Than the Engineering Angle

AS a rule most meetings held by the S. A. E. are given over to the discussion of paper and addresses of a technical nature. In this respect the Cleveland meeting differed to a considerable extent. There was practically only one paper presented, which could be called a technical paper, which was that of S. Von Ammon, of the U. S. Bureau of Standards, and in which the rear axle tests made for the Army Motor Transport Service were described. In this paper the efficiency of worm drive and internal drive axles were compared.

The thought that was uppermost in the minds of most of the speakers, was that there should be a more unified effort among the various transportation groups to co-ordinate their activities, all with the end in view of supplying better transportation to the public.

Alfred H. Swayne, vice-president, General Motors Corp., outlined the work now started by the Transportation Conference Committee, at Washington, the purpose of which is to construct a plan for railroad development work. He urged that the automotive industry give its full support to whatever plans this committee evolves. He stated that the automotive industry is one of the railroads' best customers and that if the railroads are not

allowed to earn a fair return on their investment, so that efficient transportation may be secured, the automotive industry could not carry on its business successfully.

Store door delivery was the subject of F. C. Horners' paper, in which he outlined the work done by the English railways. W. H. Lyford, vice-president of the Chicago and Eastern Illinois Railway, fully indorsed the store door delivery plan but said that the initiative on this must be taken by outsiders and not by the railroads, as otherwise the shippers would simply look upon the idea as another means for securing increased revenue for the railroads.

J. F. Murphy, vice-president of the Columbia Terminals Co., of St. Louis, read a very interesting paper which brought out the advantages of trailers and motor trucks in handling practically all of the l. c. l. freight between St. Louis, from what is known as the western truck line terminal, and the terminal of the eastern railroad trunk line in East St. Louis, across the river. Four years ago his company had in service 600 horses, 350 stake wagons and 72 motor trucks, with a capacity of 5-ton. Today they have in operation 57 tractors and 168 semi-trailers, besides about 200 wagons. This company handles nearly 7,000,000 lb. of

merchandise daily, representing 466 carloads per day. They are increasing their quota of trailers at the rate of eight per month.

The motor bus was the subject of general discussion on the second day of the convention, when one entire session was given over to it. C. D. Emmons, of the United Railway & Electric Co., of Baltimore, said that "there was no conflict between electric railways and motor vehicle industry, but that there is the heartiest co-operation." On the other hand he said "that there are many railways that are suffering from parasitic competition from unregulated motor vehicles."

Ralph W. Sanborn, secretary of the Cleveland-Akron Bus Co., took issue with Mr. Emmons, stating that he could not agree on the point that the electric railways were co-operating. At least some of them were not in Ohio. Mr. Sanborn does not believe in fare competition, as the bus should attract a distinct traffic and at higher rates.

"What's Right With the Motor Truck Industry," was the subject of a paper presented by Stephen G. Thompson, consulting engineer of the White Co., while taxicab body construction was the subject of a paper by Hugh G. Bersie, of the Haskelite Mfg. Corp.

Activities of the Motor Truck Association of Philadelphia

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W. H. METCALF, Sec'y
328 N. Broad Street

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THE COMMERCIAL CAR JOURNAL OFFICIAL ORGAN

MEMBERS of the Motor Truck Association of Philadelphia, at their monthly meeting on April 18, at the Lorraine Hotel, heard a strong indorsement of the motor truck industry from Dr. R. U. Blasingame, professor of farm machinery at the Pennsylvania State College, who addressed them on the subject, "How the Automotive Dealer of Pennsylvania Prospers With the Farmer."

F. H. Williams, president of the association, and Philadelphia manager of the White Co., introduced Dr. Blasingame as a practical authority on the transportation needs of the farmer. The speaker said that the motor truck today was as essential a part of farm equipment as a threshing machine or tractor, as the prod-

ucts of the farm were only profitable to the farmer to the extent to which he could market his products, and that the motor truck was the connecting link between the farm and the railway shipping centers. The farmer realizes that he can get better prices and better distribution by reason of good roads and motor trucks than he could in the days of bad roads and slow horse-drawn vehicles. This was particularly true, he stated, of perishable products like milk. He gave some interesting data on the increasing milk yield of cows through scientific methods at reduced expenditure.

R. S. Hurd, in charge of terminal facilities for the Pennsylvania Railroad, gave an interesting talk on the use of motor trucks for city hauling, and stated

that the Pennsylvania Railroad today is doing virtually a freight-trucking business on 450 miles of tracks in Philadelphia which they would be glad to have motor trucks take over from them, as trucks could handle the business more economically and more satisfactorily. He, however, warned the motor truck men against unscientific transportation routes, which are often operated at a loss before the transportation companies realize it.

A communication was received from the Secretary of the Pennsylvania Motor Federation criticising the president of the Keystone Motor Club for personally indorsing the proposed increased automobile license bill without the sanction of the motor club members. It was referred to the legislative committee.

Are You

10th Year

"ALWAYS ON THE JOB"

Capacity
3800 lbs. to 15,000 lbs.
Including Body

The right kind of business men will
find the selling of SIGNALS
very profitable

Hampered in your
activities by lack of capi-
tal, but ambitious to
extend your operations
and your business?

Interested in an entirely
new selling plan that
will enable you to
expand with limited
capital?

Ready at this time to
hear the details of this
unusual plan that is
arousing the enthusiasm
of every dealer who
hears it?

The Signal Motor Truck Company
invites inquiries from ambitious dealers
who are on the lookout for an excep-
tional opportunity. If you are the
type of dealer that we desire to add to
the Signal dealer organization, you can
represent the Signal line of quality
trucks that have always sold rapidly
because of their value and reputation.
You can establish or extend your

business to a marked degree without
additional capital. You can have the
constant support of the Signal factory
organization and a co-operation that is
extremely helpful toward your success.
Find out whether your territory is still
open. A letter or wire will do it and
may start you on the way to the biggest
opportunity you ever encountered.

SIGNAL TRUCK CORPORATION, DETROIT, MICHIGAN

MOTOR

SIGNAL

TRUCKS

Ⓢ THIS SYMBOL IN ANY ADVERTISEMENT MEANS: SEE "CHILTON
AUTOMOBILE DIRECTORY" FOR COMPLETE BUYING INFORMATION Ⓢ

Dealer Betterment Campaign Staged in New England

Jobbers' Club Conducting Series of Meetings, Featuring Prominent Speakers

The Automotive Equipment Jobbers' Club of New England is putting across a Dealer Betterment Campaign. Twenty-six jobbers in New England are co-operating. The plan was inaugurated on March 17 at Boston and was announced in these columns.

E. J. Ashton, who has been identified with jobbers since 1911, is touring the principal cities of New England, speaking on merchandising before gatherings of jobbers' salesmen, car and truck dealers, mechanics, etc. The first meeting was held on March 28 at Lewiston, Me., and 81 were present. The following day, at Bangor, Me., there were 376 present, representing approximately 25 towns, and Aroostook county. The following meetings have been held: Holyoke, Haverhill, Attleboro, Mass.; Providence, Woonsocket, Pawtucket, R. I.; Burlington, St. Johnsbury, Barre, Rutland, St. Albans, Vt., Saybrook, New Haven, Meriden, Winsted, Hartford, Conn. All of these meetings were well attended and went over big.

The schedule beginning May 20 is as follows: Week of May 20, Brunswick, Bath, Rockland, Augusta and Waterville, Me. May 27, Worcester County, Mass., and including Worcester, Southbridge, Fitchburg, Gardiner, and Webster. June 4, Boston and suburbs. A second schedule is being prepared and will cover those cities visited.

Speaker Ashton advises that he finds the dealers and trade keenly interested in the flat rate for car and truck maintenance and that much of the information imparted was obtained from the trade papers. In his talks Mr. Ashton quotes facts and figures of the automobile industry and describes its development from its inception. Charts are employed to emphasize the points. The "Ask 'Em to Buy," and "Shop Profits" films are shown at each meeting.

The following jobbers are co-operating in the campaign:

The Post & Lester Co., Hartford and branches.
Wetmore-Savage Co., Boston and Springfield.

James Bailey Co., Portland, Me.
American Motor Equipment Co., Boston.
The Tarbell-Watters Co., Springfield, Mass.
Linscott Supply Co., Boston.

Hub Cycle Co., Boston.
Waite Auto Supply Co., Providence, R. I.
Belcher & Loomis Hardware Co., Providence, R. I.

Providence Auto Equipment Co., Providence, R. I.

L. I. Ensworth & Son, Hartford.
Horton, Gallo & Creamer, New Haven.
C. S. Mersick & Co., New Haven.
The Auto Equipment Co., Worcester.
Alsten & Goulding Co., Worcester.
Duncan & Goddell Co., Worcester.
Rice & Miller Co., Bangor, Me.
Vermont Hardware Co., Burlington, Vt.
Hagar Hardware Co., Inc., Burlington, Vt.
Butts & Ordway Co., Boston.
Decatur & Hopkins Co., Boston.
Bigelow & Dowse Co., Boston.
Darling Auto Co., Inc., Auburn, Me.
Goodby-Rankin Co., Providence, R. I.
Geo. Collins Company, Boston.
Hessell & Hoppen Co., New Haven.

Ralph P. Greene, Wetmore-Savage Company, Boston, is secretary of the committee, which urges all in the trade to attend these meetings as Mr. Ashton imparts information which is helpful to all in the selling and servicing branches of the industry. There is no admission or collections at these meetings to which all are invited.

Improvements in Truck Service Under Consideration

Service managers of truck and parts companies belonging to Motor Truck Industries, Inc., held a meeting in Detroit, April 25th, to consider the betterment of motor truck service methods and took the initial steps toward an investigation of the flat-rate method of truck maintenance, for the purpose of introducing it into the truck industry.

The first part of the meeting was given over to an inspection of a full line of service shop tools designed and built especially for the Federal Motor Truck Co. by the Miller Tool & Mfg. Co., of Detroit. Federal service shops throughout the country will be equipped with the line.

Mr. Miller, president of the company, gave a very comprehensive talk on the uses of the various tools and showed how better work could be done and time saved on practically all service operations. He described the application of the tools in detail and at the conclusion of his talk answered many questions as to the practical application of the tools in cutting down shop expense on trucks.

A. V. Comings, Commercial Editor of CHILTON publications, talked to the service managers on "Flat-Rate Methods in Servicing Motor Vehicles," and reviewed the development of this method from the time it was first introduced among the better type of passenger cars down to the present time. He urged the service managers to get started on this method of maintenance just as soon as possible in their many dealer service shops, and to insist on the shops being equipped properly to give service at economical costs to the truck owner.

Mr. Comings also touched on the success that many car service shops are having through a combination of flat-rate charges to the car owner and a piecework rate of payment to the mechanic, the two having solved many of the problems that have previously made the service manager's life a miserable one.

It is expected that real progress will be made by the service managers in getting started on flat-rate methods during the coming year.

Truck Price Changes

Motor truck manufacturers announcing changes in the prices of their productions since the last issue of the COMMERCIAL CAR JOURNAL are as follows: Gramm Bernstein Motor Truck Co., Lima, Ohio, (a reduction of \$50 on the 2-ton model); Corbitt Motor Truck Co., Henderson, N. C., (reduction on six models) and the Garford Motor Truck Co., also of Lima, Ohio, (increase on five models).

N. A. D. A. Pacific Coast Meetings Scheduled for June

Four Meetings Planned for Los Angeles, San Francisco, Portland and Olympia

Four district meetings of the National Automobile Dealers Association have been determined upon for the Pacific coast, in June, is an announcement made by Lynn M. Shaw, assistant general manager. The original intention had been to provide two district meetings, one in California and one in either Oregon or Washington.

Demands by the dealers in the Pacific coast states became too insistent and the rivalry between cities become so great, that it was slightly embarrassing to N. A. D. A. executives. Considering all the points of vantage and benefit as advanced by Mayor Baker of Portland, Ore., and by the Seattle Automobile Dealers, it became evident that there was a compromise necessary. The same condition developed in the rivalry between Los Angeles and San Francisco as to which of these two cities should be selected for the California meeting.

In announcing the plans for the district meetings, the N. A. D. A. officials made known to Pacific coast leaders among the dealers, that the meetings would have practically the same program that was featured in the national convention in Chicago in January. This announcement stirred up a great interest and an unexpected demand from automobile dealers who wanted the program produced on the Pacific coast.

In the final analysis, Mr. Shaw says that the decision for four district meetings was made with the sole desire of making the convention program available to the greatest number of automobile dealers. In order not to show preference between districts, the decision was to have a meeting in Portland for the state of Oregon, another in Olympia, Wash. at the time of the Washington Automobile Trade Association annual convention.

The same reasons influenced the decision for two meetings in California. The first of these will be in Los Angeles and the second in San Francisco. The southern California dealers will be invited to the Los Angeles convention and the northern California dealers invited to the San Francisco convention.

The dates assigned for these district meetings are:

Los Angeles.....June 18
San Francisco.....June 21
Portland.....June 25
Olympia, Wash.June 29

The program will be made up of five nationally known leaders in the automobile industry. Charles E. Gambill, of Chicago, vice-president of the N. A. D. A. will preside at all four of the meetings. The semi-annual meeting of the N. A. D. A. board of directors is expected to be in San Francisco, following the San Francisco district meeting.



Window of Nebraska Buick Auto Co., Lincoln, Neb.

Your window can Ask'em to buy



It has been fairly well proved that the window display which is concentrated on one product for a period of time brings in more returns than when it is used to display all kinds of products all the time.

The picture above shows how attractive a window can be made on Johns-Manville Non-Burn Brake Lining.

You can get this material for display in your window from your distributor (listed three pages over). It will pay for its window space many times over.



STOP!

JOHNS-MANVILLE
NON-BURN
Automotive Brake Lining

*You can get a flange sign
like that shown in the pic-
ture from your distributor*

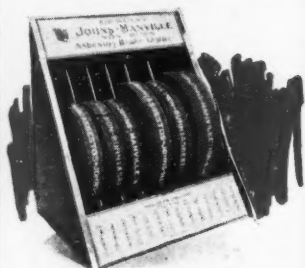
New laws that mean new business

IN Brooklyn, N. Y., the police department found that 80% of all automobile accidents were due to defective brakes. Laws have been passed in many cities and states which require frequent brake inspection. Bad brakes are being convicted at last.

This will bring a lot of new lining business into your shop. You should not only be prepared to meet it but you can go after more. Inspect the brakes of all cars that come into your place and advise the owners of the condition of their brakes.

If they need re-lining, you will get the business and it always helps to be able to tell the customer that you are re-lining with Johns-Manville Non-Burn because you know that brakes are safer and last longer with this brake lining.

We are telling this story in the national magazines. We are telling the public in newspapers all over the country and these newspaper advertisements bear the names of all established Johns-Manville dealers. Get in on this.

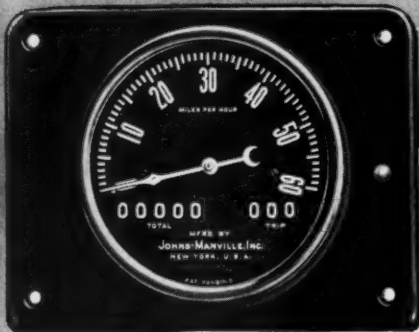


FREE TO DEALERS

*With every initial 300 feet
order of Johns-Manville
Brake Lining, we give this
handsome metal display rack.*

JOHNS-MANVILLE

Automotive Equipment



Johns-Manville Speedometer for Ford Cars

There is a blank space on the instrument board of every new Ford that looks mighty empty to its owner. Here is the finishing touch—a shining black and nickel speedometer—which tells how far, how fast and how many miles per gallon. Catalog No. 3023.

Ask your distributors' salesmen to show you our speedometer for the new Star car. You will soon have call for them.

Johns-Manville Asbestos Clutch Facings

These facings are ready made to fit all standard makes of cars requiring disc facings. They are easy to attach because they are drilled and countersunk for mounting—great time savers on any facing job. You can get them either woven or compressed at a moment's notice from your distributor.

Johns-Manville Automobile Tape

The chief virtue of this tape is one that most tapes lack and that is stickiness, and it stays sticky. In fact, its stickiness is guaranteed.

Johns-Manville Automotive Service Sheet Packing

Service sheet is thin—and for a reason. Thin sheet packings make tightest joints because the smallest area is exposed. This also means greatest economy.

Johns-Manville Automotive Seigelite Sheet Packing

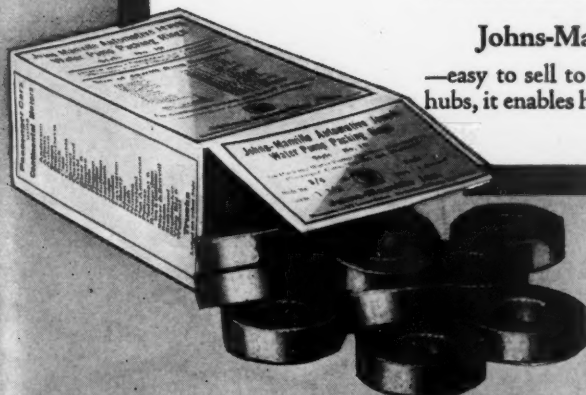
—its high tensile strength and durability make it very desirable for gasketing water manifolds, differential housings, carburetors, etc.

Johns-Manville Automotive Jewett Ring Packing

—for use on water pump shafts and other places where a ring of small cross-section is required. Contains no rubber. One of its greatest advantages over other forms of packing, however, is the time it saves in installation.

Johns-Manville Hub Odometer

—easy to sell to the business man. On his truck hubs, it enables him to keep track of trucking costs.



CHOOSE YOUR DISTRIBUTOR

Alabama

Moore-Handley Hardware Co.,
Birmingham
Johnson Tire & Auto Co., Montgomery

Arkansas

Crow-Burlingame Co., Little Rock

California

Chanslor & Lyon Co., Fresno
The Banta Company, Los Angeles
Chanslor & Lyon Co., Los Angeles
Featherstone, E. A., Los Angeles
McCoy Motor Supply Co., Los Angeles
Chanslor & Lyon Co., Oakland
Wenstock-Nichols Co., Oakland
Kimball-Upson Co., Sacramento
P. W. Gavin Company, San Diego
Chanslor & Lyon Co., San Francisco
McCoy Motor Supply Co., San Francisco
Wenstock-Nichols Co., San Francisco
California Auto Supply Co., Stockton

Colorado

Auto Equipment Co., Denver
Foster Auto Supply Co., Denver
Motor Accessories & Tire Co., Pueblo

Connecticut

Hessel & Hoppen Co., New Haven
Motor Tire Service Co., Putnam

District of Columbia

National Electrical Supply Co.
Rubel, Chas., & Co.

Florida

Baughman Company, G. Norman,
Jacksonville
Baughman Company, G. Norman, Miami
Baughman Company, G. Norman, Tampa

Georgia

Alexander-Seewald Co., Atlanta
Osborn-Abston & Co., Atlanta
Cody Co., W. E., Columbus

Illinois

Automobile Supply Co., Chicago
Chicago Automobile Supply House,
Chicago
Motor Car Supply Co., Chicago
Sheridan Auto Supply Co., Chicago
Tenk Hardware Co., Quincy
Washington Auto Supply Co., Washington

Indiana

Orr Iron Co., Evansville
Lomont & Co., Ft. Wayne
The I. J. Cooper Rubber Co., Indianapolis
Goodlin Auto Equip. Co., South Bend

Iowa

Cedar Rapids Auto Supply Co., Cedar
Rapids
Sleg Co., Davenport
Herring Motor Co., Des Moines
Repass Auto Co., Waterloo

Kansas

The Frank Colladay Hardware Co.,
Hutchinson
Watson-Weldon Co., Salina
Southwick Auto Supply Co., Topeka
The Massey Hardware Company, Wichita

Kentucky

Peaslee-Gaulbert Co., Louisville

Louisiana

Shuler Auto Supply Co., New Orleans
Interstate Electric Co., Shreveport

Maine

The Farrar-Brown Company, Inc.,
Portland

Maryland

Auto Supply Co., Baltimore
Coggins & Owens, Baltimore

Massachusetts

Linscott Supply Co., Boston
Motor Tire Service Co., Fitchburg
Duncan & Goodell Co., Worcester
Motor Tire Service Co., Worcester

Michigan

E. A. Bowman, Inc., Detroit
Tisch Auto Supply Co., Grand Rapids

Minnesota

Kelley-Duluth Co., Duluth
Minneapolis Iron Store Co., Minneapolis
Reinhard Bros. Co., Minneapolis
Williams Hardware Co., Minneapolis
Nicols, Dean & Gregg, St. Paul

Missouri

Joplin Supply Co., Joplin
The Fast Company, Kansas City
Ayers Farmer Auto Supply Co., St. Joseph
Beck & Corbitt Iron Co., St. Louis
Fred Campbell Auto Supply Co., St. Louis
Geller, Ward & Hasner, St. Louis
Hermann-Sanford Company, Springfield

Montana

Northwestern Auto Supply Co., Billings

Nebraska

Nebraska Bulk Auto Co., Lincoln
Storz-Western Auto Supply Co., Omaha

Nevada

Nevada Auto Supply Co., Reno

New Hampshire

Thompson & Hoague Company, Concord

New Jersey

Economy Auto Supply Co., Newark
Fruden Hardware Co., Newark

New York

Albany Hardware & Iron Co., Albany
Martin-Evans Co., Brooklyn
H. D. Taylor Co., Buffalo
Barker, Rose & Clinton Co., Elmira
Weaver-Ebling Co., New York City
Pruden Hardware Co., W. E.,
New York City
Whittemore-Sim Co., Inc.,
New York City
The Olmstead Co., Inc., Syracuse

North Carolina

Carolinas Auto Supply House, Charlotte
Ko-Mo Supply Co., Charlotte
Automobile Supply Co., Wilmington

North Dakota

Grant-Dadey Company, Fargo

Ohio

The Penn. Rubber & Supply Co., Akron
C. & D. Auto Supply Co., Cincinnati
The I. J. Cooper Rubber Co., Cincinnati
The Penn. Rubber & Supply Co.,
Cincinnati
The Penn. Rubber & Supply Co.,
Cleveland
The I. J. Cooper Rubber Co., Columbus
The Penn. Rubber & Supply Co.,
Columbus
The I. J. Cooper Rubber Co., Dayton
The Penn. Rubber & Supply Co., Toledo
The Penn. Rubber & Supply Co.,
Youngstown

Oklahoma

Severin Tire & Supply Co., Oklahoma City
Severin and Company, Tulsa
Machinery & Supply Co., Tulsa

Oregon

Wiggins Company, Inc., Portland
Chanslor & Lyon Co., Portland

Pennsylvania

Motor Accessories Co., Allentown
Central Supply Co., Altoona
The Penn. Rubber & Supply Co., Erie
Front Market Motor Supply Co.,
Harrisburg
General Auto Supply Co., Harrisburg
Johnstown Auto Co., Johnstown
General Auto Supply Co., Lancaster
The Penn. Rubber & Supply Co., Oil City
Berroldin Auto Supply Co., Philadelphia
Gaul, Derr & Shearer Co., Philadelphia
Roberts Electric Supply Co., H.C.,
Philadelphia
Dyke Motor Supply Co., Pittsburgh
Jackson Motor Supply Co., Pittsburgh
General Auto Supply Co., York

Rhode Island

Belcher & Loomis Hardware Co.,
Providence

South Carolina

Frankie Co., Inc., C. D., Charleston
D. W. Alderman, Jr., Inc., Florence
D. W. Alderman, Jr., Inc., Greenville

South Dakota

L. & L. Motor Supply Co., Sioux Falls

Tennessee

Southern Auto Supply Co., Chattanooga
The I. J. Cooper Rubber Co., Knoxville
Osborn-Abston & Co., Memphis
Auto Supply Co., Nashville
The I. J. Cooper Rubber Co., Nashville

Texas

Ferris-Dunlap Co., Dallas
Tri-State Motor Company, Inc., El Paso
The Equipment Co. of Texas, Fort Worth
Meyer Co., Jos. F., Houston
The Southern Equipment Co., San Antonio
McCauley-Ward Motor Supply Co., Waco

Utah

Inter-Mountain Electric Co., Salt Lake City
Motor Mercantile Co., Salt Lake City

Vermont

Vermont Hardware Co., Burlington

Virginia

The Owens-Merritt Co., Danville
Piedmont Hardware Co., Danville
Crump Co., Benj. T., Richmond
Talman Auto Supply Co., Richmond
Meadows-Price Co., Roanoke

Washington

Chanslor & Lyon Co., Seattle
Reynolds & Reynolds, Seattle
Chanslor & Lyon Co., Spokane
Holley-Mason Hardware Co., Spokane
Chanslor & Lyon Co., Tacoma
Reynolds & Reynolds, Tacoma

West Virginia

Williams Hardware Co., Clarksburg

Wisconsin

Clemons Auto Supply Co., Eau Claire
Andrae & Sons Co., Julius, Milwaukee
Shadbolt & Boyd Iron Co., Milwaukee
Tisch Auto Supply Co., Milwaukee
Western Motor Supply Co., Milwaukee

Wyoming

Auto Equipment Co., Casper

CANADA

Alberta

The Motor Car Supply Co.,
of Canada, Ltd., Calgary
The Motor Car Supply Co.,
of Canada, Ltd., Edmonton

British Columbia

Marshall-Wells, B. C., Ltd., Vancouver

Manitoba

Wood, Vallance, Ltd., Winnipeg

New Brunswick

The Lounsbury Company, Ltd., Newcastle

Nova Scotia

J. J. Snook Ltd., Truro

Ontario

The Nicholson Sales & Service Corp., Ltd.,
Hamilton
A. Chown & Co., Ltd., Kingston
Just Motors Limited, Ottawa
Samuel Trees & Co., Ltd., Toronto
Bowman-Anthony Co., Windsor

Saskatchewan

Wood, Vallance, Limited, Regina

FOREIGN

England

A. C. R. Greene & Co., Ltd., London

New Zealand

Jas. J. Niven & Co., Ltd., Wellington

New South Wales

Hilop, Lloyd & Co., Sydney

South Australia

Cornell, Ltd., Adelaide

Queensland

Canada Cycle & Motor Agency, Brisbane

JOHNS-MANVILLE Inc.

Madison Avenue at 41st Street, New York City
Branches in 56 Large Cities

For Canada:

Canadian Johns-Manville Co., Ltd., Toronto



Paige Motor Truck Manufacture Discontinued

Forced by the rapidly increasing demand for Paige and Jewett passenger cars to use every possible means to increase production the Paige-Detroit Motor Car Co. has announced that the manufacture of Paige motor trucks has been discontinued.

This will enable the company to devote all its facilities to passenger car production. Despite extensive additions to factory floor space in the past year it was found impossible to satisfy the demands of Paige-Jewett dealers, although the Paige plant has been working to capacity all winter. The present move is expected to offer material relief.

The company's service department will continue to service all Paige trucks as in the past.

I. H. C. Will Again Hold "Red Baby" Contest

The Red Baby contest, which proved so successful last year, is to again be held this year by the International Harvester Company of America. A total of \$31,000 will be divided into \$1,000 prizes to go to McCormick-Deering dealers who turn in the largest percentages of business in their respective territories.

In order to qualify for the contest, McCormick-Deering dealers must operate this year for six months or more at least one special Red Baby speed truck purchased either in 1922 or 1923. This is an International truck with a special red body with gold lettering. The basis upon which dealers will work for the \$1,000 prize in each state (states in several cases) will be slightly different from that on which they operated last year. The prize will finally go to the Red Baby dealer in each district who increases, by the greatest percentage over his base, his volume of sales of all of the items in the McCormick-Deering fifty-four line.

The use of this truck has been of inestimable value to the dealer in helping

him sell his goods, and has met with the hearty approval of all in the selling organization. It has introduced to the farmer a new kind of at-the-farm service and has permitted the dealer to act as a consulting engineer for the solution of farm difficulties.

Big Frame Merger Plans Announced

CLEVELAND, O., April 30.—Merger of the Parish & Bingham Co. and the Detroit Pressed Steel Co. into a new organization, known as the Midland Steel Products Co., awaits the decision of stockholders of both companies. Parish & Bingham stockholders are to meet May 5 and Detroit Pressed Steel stockholders May 10. The proposed merger plan anticipates providing working capital through the floating of \$2,500,000 of 7 per cent convertible bonds.

There will also be \$7,000,000 of 8 per cent cumulative and participating preferred stock, representing the purchase price of the two companies at \$3,500,000 each. In addition to this there will be an issue of 50,000 shares of no par common stock to be held by a banking syndicate and E. J. Kulas, president of the Parish & Bingham Co.

Sales Managers Organize National Body

At a recent meeting held at the New York Advertising Club by a committee representing the New York Sales Managers' Club and the Sales Managers' Clubs of Philadelphia, Boston, St. Louis, Milwaukee, St. Paul and Columbus, it was decided to organize the National Association of Sales Managers, the first meeting to be held at Atlantic City, June 7, directly following the convention of the Associated Advertising Clubs of the World. Membership in the Association will be confined to sales managers, either as individuals or as a club membership.

Schwarz Wheel Patent Sold to Crane-McMahon

The Schwarz Wheel Company, Philadelphia, Pa., which has most successfully manufactured the Interlocked Spoke type of wheel under the original Schwarz patent since the Company was established in 1904, has announced the sale of the patent.

The Schwarz Wheel became famous in the early days of the industry and is one of the best known wheels to-day, not only because of its great strength, but also because of the positive lock at the hub which this construction insures. It is announced that Crane-McMahon of St. Mary's, Ohio, purchasers of the Schwarz patent, will continue the policy of manufacturing this excellent wheel both in wood and steel felloe types.

S. Vance Lovenstein, president and general manager of the Schwarz Wheel Co. on June 1, this year will join the Eugene McGuckin Company of Philadelphia as vice-president of that organization. The Eugene McGuckin Company is an advertising agency well known in automotive advertising circles because of the highly commended work that it has done in the past ten years for a number of prominent automotive advertisers.

Mr. Lovenstein, by reason of his extensive knowledge of automotive and other fields of merchandising, will bring to the Eugene McGuckin Company a wide experience that should prove of utmost value to the clients of this agency.

Walker Vehicle Opens Atlanta Branch Office

The Walker Vehicle Company of Chicago, manufacturers of Walker balance drive electric trucks for city routes, has opened a branch office in Atlanta, P. C. Pomeroy, who has had extensive experience in trucking matters while representing the White and Packard organizations, has been appointed district manager, with offices at 926 Hurt Building, Atlanta.



A Quarter Million Dollar Shipment of Federals Which Recently Left Detroit on a Train Load of Thirty-eight Cars
This huge shipment is to be divided among the Federal Distributors in the Boston territory. It is stated that the peculiar and difficult railroad conditions in this section have created such a demand for trucks that Federal dealers have had hundreds of prospects on file awaiting shipment into New England.

Large Axle and Spring Merger Completed

With new capital acquired through the subscription of 140,000 shares of no par capital stock at \$30 a share, the recently organized Eaton Axle & Spring Co., of Cleveland is in a position to become one of the largest parts manufacturers in the country. The Company is now made up of the Torbensen Axle Co., the Eaton Axle Co., and the Perfection Spring Co., all of Cleveland. The combined floor space of these three companies will give 573,000, sq. ft.

A nation-wide banking group which included Morgan, Livermore & Co.; Otis & Co.; Howe, Snow & Bertles and Paul H. Davis & Co., made the 140,000-share stock offering. This offering results in a total of 220,000 shares of Eaton and Torbensen stock outstanding. The Eaton and Perfection plants were acquired by private deals with the receiver in Cleveland, recently, when public sales failed to develop adequate bids.

Officials of the various plants making up the consolidation will remain in charge of the new organization. J. O. Eaton, president of the Torbensen Axle Co., will be the directing head of the company. C. I. Ochs, formerly general manager of the old Eaton company will be vice-president and general manager of the axle division.

Dan C. Swander, general manager of the Perfection Spring Co., is to be vice-president and general manager of the spring division. R. C. Enos general manager of the Torbensen Axle Co., will be vice-president and director of sales. P. T. Hill, sales manager of the Eaton Axle Co., will be in charge of sales of the axle division. G. W. Carlson chief engineer of the Torbensen, will be director of engineering with E. V. Elconin chief engineer of the axle division.

F. A. Buchda, secretary and treasurer of Torbensen, will be treasurer in charge of finances and credits, with H. C. Steussy, comptroller of the axle division and H. D. Knerr comptroller of the spring division.

Automotive Wage Earnings Increased Since 1914

Average hourly earnings of wage earners in the automobile industry were 59.2 cent in December 1922, or 102 per cent above the July 1914 level of 29.3 cent, according to National Industrial Conference Board studies of wages in the United States which are now being completed and will be published at an early date. In the agricultural implement industry the increase was 88 per cent and in Northern cotton manufacturing, 130 per cent.

The average weekly earnings of all wage earners in automobile manufacturing advanced in the same period from \$15.09 to \$28.85, or 91 per cent. In the agricultural implement industry the increase was from \$13.78 to \$24.56, or 78 per cent, and in Northern cotton manu-

facturing the increase was from \$9.16 to \$19.60, or 114 per cent.

Average hourly earnings, December, 1922:

Male skilled labor in manufacturing	
Automobiles	\$0.623
Agricultural implements	.538
Cotton	.466

Male unskilled labor in manufacturing	
Automobiles	\$0.469
Agricultural implements	.407
Cotton	.377

Female labor in manufacturing auto-	
mobiles	\$0.407
Agricultural implements	.338
Cotton	.356

Preparations for Big Attendance at Body Convention

Detroit is to be the gathering ground of the members of the Automobile Body Builders' Association during the third annual convention of this organization at the Hotel Statler, June 26 to 27. Preparations are being made for the association's biggest convention.

Last year the A. B. B. A. had a membership increase of over 80 per cent and as the same numerical increase is taking place this year the committee is assured of an excellent attendance.

The primary purpose of the convention, aside from educational and social benefits that will accrue to each member, is to promote a more sympathetic understanding by the car manufacturers, the body builders and the makers of materials and parts, of the troubles that each must overcome in their individual efforts to increase the service and beauty of automobiles and at the same time decrease their cost of production and distribution.

Just now the program plans are only tentative, but an effort is being made to obtain a number of excellent speakers.

Ford Truck Sales Set New First Quarter Record

Sales of 41,681 Ford trucks during the first quarter setting a new high record, bear out predictions made earlier that the use of the one-ton truck in hauling and delivery systems will be greater this year than ever before.

March sales of Ford trucks, which reached the new high mark of 18,717, exceeded by more than 1000 the sales of the first three months of 1922, totaling 17,586 and were 50 per cent higher than the sales in February of this year.

Friday, April 13th, set up more new records for the Company than any one day this year. Assembly plants of the Ford Motor Co., on April 13, produced a total of 6,494 completed cars and trucks, exceeding by 41 the previous high record of 6,453 set up on April 3. The Fordson Tractor plant at River Rouge turned out 532 completed Fordsons, a new high record for daily production.

The River Rouge foundry produced a total of 9,806 cylinder castings, establishing a new high mark and topping the previous high day, April 10, 1922, when 9,467 were cast. Of this number 9,025 were Ford Model T cylinders and 731 Fordson cylinders.

Midwest Engine Corporation Enters New Field

In addition to the manufacture of its regular line of engines the Midwest Engine Corporation of Indianapolis has recently started a new project which will occupy certain portions of the plant at Indianapolis, which sections have been standing idle since the company discontinued war work.

The new work to be undertaken will be the reconditioning of freight cars and railway locomotives. The company has been successful in obtaining several contracts for this work and preparations are being made for a capacity to recondition 300 freight cars per month and twelve locomotives per month.

The original line of business of the Midwest Engine Corporation, namely, that of manufacturing engines for passenger cars, taxicabs, motor buses, trucks and tractors will be continued and will be expanded as rapidly as conditions warrant. The company has recently secured some good business for its new line of six cylinder engines and there are also a number of prominent manufacturers testing the new six cylinder engine with a view to possible adoption.

Ferdinand Barnickol is chairman of the board of directors of the Midwest Engine Corporation; H. C. May is president and John C. Wood is vice-president and Leo M. Rappaport is secretary.

Canadian Truck Maker Has Detroit Factory

The Gottfredson Truck Corp., just recently started production operations in its Detroit factory. The company is the American development of the Gottfredson Truck Corp., Ltd., of Canada, with factories at Walkerville, Toronto, Montreal and London, England.

The officers are Benjamin Gottfredson, president and general manager; Robert Gottfredson, vice-president; C.R. Burridge, purchasing agent; N. R. Brownier, engineer; K. Fogle, superintendent; and R. B. Gottfredson, sales manager. Benjamin Gottfredson is also president of the American Auto Trimming Co., with factories at Detroit, Walkerville and Cleveland, with which company the other officials of the truck company are also closely associated.

The trucks are made in five models, a 1-ton, 1½-ton; 2½-ton; 4-ton and 5-ton. The prices range from \$1595 to \$4775. All models are powered by a 4-cylinder engine; a Brown-Lipe clutch is used, also a Brown-Lipe transmission; Timken front and rear axles.

These trucks have been enjoying a wide reputation in Canada as well as in Europe. It has never been the policy of the company, officials say, to operate under sales pressure but always to keep its production under rather than over the demand.

The Yellow Taxi Corp., New York City recently purchased 500 new yellow cabs which will greatly increase its taxi facilities in Greater New York. The company is starting to equip every cab with a taximeter that gives a receipt.

Corporation Promoting Use of Electric Trucks

The Electric Truck Transportation Corporation, 25 W. 43rd Street, New York, N. Y. was organized to promote the use of electric trucks in their proper field so that full advantage can be taken of their economy; to relieve merchants of all the trouble incident to transportation and to furnish same at the lowest cost. It is managed by experienced men who have spent over twenty years in electric transportation and know each angle thoroughly.

The Corporation will co-operate with light and power companies in all large cities in the erection of electric garages from which Electric trucks will be offered for sale on deferred payment and with complete operating costs guaranteed.

D. J. Rowland Dies

The Packard Electric Co. announces the death of D. J. Rowland, Cleveland district representative of its automotive cable division, which occurred on the evening of May 1st, at Cleveland, Ohio. Mr. Rowland was buried from the Plymouth Congregational Church of Youngstown, Ohio, which was his home for many years. "Dave," as he is familiarly recalled, was particularly well-known among the automotive manufacturers and jobbers of Ohio, Western Indiana and Eastern Pennsylvania.

World-Wide Survey Planned by Institute

The National Transportation Institute, recently formed in Chicago, is planning a world-wide survey of transportation in all its phases. The inquiry will include every question connected with transportation on railroads, inland waterways, lakes, highways, and the sea. The Institute will investigate all branches of transportation in relation to each other, and in industry and commerce as a whole and will send representatives to examine into the transportation systems of foreign nations.

Officers of the Institute are James R. Howard, former president of the American Farm Bureau, who is president; Edgar Clark, former Chairman of the Interstate Commerce Commission, chairman of the Research Council and Representative Sydney Anderson of Minnesota, vice chairman.

Highway Traffic Meeting at New York

The advancement of the efficiency of highway transportation and the regulation of highway traffic are two of the subjects being discussed at the annual meeting of the National Highway Traffic Association at the Assembly Hall of the Automobile Club of America, New York City, on May 10. A brief account of this important meeting will be given in the June issue of the COMMERCIAL CAR JOURNAL.

Brunswick Had Good Fiscal Year

The Brunswick-Balke-Collender Co., of Chicago, has issued the following financial report for the fiscal year ending December 31, 1922:

The net income for the year amounted to \$2,585,578.65. During the year 1922 liabilities were reduced to the extent of \$1,998,024.16 not including the balance of a Purchase Money Obligation \$294,989.82 assumed by the company during the year in connection with the purchase of a warehouse in Chicago and during the first quarter of 1923 a further reduction of \$856,628.38 was affected. Inventories during the year were reduced \$410,000. "The prospects of the year 1923," states B. E. Bensinger president of the company, "are most encouraging as evidenced by the showing for the first quarter. Our net earnings during this period amounted to \$631,631.34."

GMC Issues Report for First Quarter

General Motors Corporation for the quarter ended March 31st, reports earnings after taxes, available for debenture and preferred dividends of \$19,406,123. This is equivalent to 11.4 times the dividend requirements on the debenture and preferred stocks.

After deducting dividends for the first quarter on the senior securities, there remained \$17,704,199 earned on the common stock. This is equivalent to 8.6 per cent on the 20,646,327 outstanding shares of common stock valued at \$10 per share upon the books of the Corporation, or at the annual rate of 34.4 per cent.

In the first quarter there were sold 176,417 cars and trucks, compared with 71,039 in the first quarter of 1922. These sales include Buick, Cadillac, Chevrolet, Oakland and Oldsmobile passenger and commercial cars and GMC trucks.

Fire Apparatus Now Has Own Classification

The Automotive Division of the Bureau of Foreign and Domestic Commerce, through M. H. Hoepli, acting chief, desires to inform the trade that a special classification for exports of fire-fighting apparatus, effective January 1, 1923, has been secured as follows:

Schedule B, Class Number 7701
Fire Engines, No.

All exports of fire-fighting apparatus should be classified under this heading, whether they be comprised of fire engines, hook and ladder trucks or chemical wagons, motor, horse or hand propelled. It is hoped that all exporters of the above products will properly classify their exports under the above heading, on the shippers' Export Declaration, Customs Form 7525, in order that the export figures may be of the greatest value to all members of the industry.

D & B Holding Selling Contest for Salesmen

Backing up the "Ask 'Em to Buy" campaign of the Automotive Equipment Association, with real action Dalton & Balch, Inc., Chicago, manufacturer of D & B Silent timing gears, has organized a sales contest for jobbers salesmen which is now in progress.

One thousand dollars is to be given in prizes to the men making the greatest number of sales over a period of three months. Prizes will be distributed as follows: \$500 to the jobbers' salesmen east of the Mississippi and \$500 to the salesmen west of the Mississippi. First prize in each territory is \$250 in cash, 2nd, \$100 and 3rd \$50. To the salesman in either territory who sells the greatest number of D & B timing gears for trucks; 1st prize, \$75 and 2nd prize, \$25.

Sprague Offices Undergo Change

The Sprague Electric Works of General Electric Co., announces the consolidation of its district and local offices with corresponding offices of the General Electric Co., effective April 1, 1923. The manufacture and exploitation of Sprague products will be continued in the name of General Electric Co. in the recently organized merchandise department.

The Sprague conduit products section and the Sprague apparatus section of the merchandise department will, for the present, continue offices at 527 W. 34th St., New York City.

George Markland, President of Gear Manufacturers' Association

One of the best conventions in the history of the organization was held by the American Gear Manufacturer's Association, April 19, 20 and 21, at the Hotel Cleveland, at Cleveland, Ohio. Of special note was the diversity of subjects pertaining to the gear industry covered by the speakers.

Officers elected during the convention were: George L. Markland, Jr., president; A. W. Copland, first vice-president; B. F. Waterman, second vice-president and C. F. Goedke, treasurer.

A. O. Smith Offers New Bond Issue

A new issue of \$5,000,000 A. O. Smith Corp., 10-yr. closed mortgage 6½ per cent bonds is being offered by Dillon, Read & Co. and White Weld & Co. The bonds are to be dated May 1, 1923 and are due May 1, 1933. A semi-annual sinking fund is provided to retire by purchase or call approximately \$2,000,000 of bonds during the life of the issue. These bonds are being issued at 100 and interest to yield 6½ per cent.

Personal Items

James A. Bennett has been made sales manager of the Connecticut Telephone & Electric Co., Meriden, Conn. He succeeds Charles E. Stahl.

George W. Brooks has again become associated with the Hudson Motor Specialties Co., of Philadelphia, as special representative.

Col. Fred Cardway, formerly vice-president and general manager of the Packard Motors Export Corp., and internationally known in automotive export trade, has been appointed director of exports for the Haynes Automobile Co., with offices in New York City.

John C. Cotter has been announced as an executive of the Western Drop Forge Co., of Marion, Ind. He was for 20 years, associated with J. H. Williams & Co., of Brooklyn and Buffalo, N. Y.

Charles S. Dahlquist, well known in the automotive trade, has returned to his former connection with the Timken-Detroit Axle Co. He will cover the central territory, which includes Michigan, Ohio, Western Pennsylvania, Canada and part of New York State.

D. C. Evans has been announced as assistant general manager of the Denby Truck Corp. Mr. Evans is a truck man of much experience and has been connected with the Denby in various capacities.

C. S. Gill has been appointed sales manager of the Vini Motor Truck Co., of Philadelphia, succeeding Sydney H. Hale, who recently resigned. He has been with the company since 1918, except for a year with the Stuyvesant Motor Co. He has been in charge of the New York branch, which position he retains in conjunction with his duties as sales manager.

A. B. Hance, who has been identified with the merchandising of automotive products for 18 years, and who has for the past year and a half covered the northeast territory for the Cuno Engineering Corp., Meriden, Conn., has been appointed general sales and advertising manager of that company.

Ray Harroun, nationally known as an engineer and former racing driver, has been made manager of the factory equipment division of the Lincoln Products Co., Chicago. His headquarters will be Detroit.

Rushmore B. Heed has been appointed head of corporation sales by the Diamond T Motor Car Co., of Chicago. He began his truck career seven years ago with the Diamond T Company as a retail salesman. Since that time he has been Chicago

branch manager for the Diamond as well as Chicago branch manager of the Republic.

F. W. Henkel has been announced as manager of the Chicago territory of Jacobs & Company, advertising managers of religious magazines, his headquarters to be Room 1148, First National Bank Bldg., Chicago. Mr. Henkel at one time represented the COMMERCIAL CAR JOURNAL in Chicago.

Harland M. Hostetler has become secretary-treasurer and general manager of the Goshen Stamping & Tool Co., Goshen, Ind. This firm was recently incorporated to continue the manufacture on a much larger scale, of machinery, tools, dies, sheet metal specialties, etc.

Arthur A. Kaiser, formerly with the Ford Motor Co., Highland Body Co., and White Truck sales, is now associated with the sales department of the Thompson Auto Co., selling Federal Trucks.

Paul W. Lawther has been made sales manager of the S. F. Bowser & Co., of Texas, located at Dallas.

W. P. Loveless has been advanced from the position of sales manager of the Wm. R. Johnston Mfg. Co., Chicago, to that of assistant general manager. C. B. Johnston has been made sales manager of company.

Frank J. Mooney, who was at one time advertising manager for the Hupp Motor

Car Co., later joining Taylor-Critchfield-Craig Co., has organized an advertising agency in San Francisco. The firm will be known as Kelsey-Mooney-Stedem, Inc., and will handle only national and sectional business.

Etienne Planche, who has been chief engineer of the Dort Motor Car Co., for the past nine years, has resigned. He has opened offices as a consulting engineer in the General Motors Bldg., Detroit.

L. B. Sanders, secretary of the Boston Used Car Statistical Bureau since its organization has resigned to join the Cole Motor Car Co., acting as special factory representative in the New England territory.

James W. Stewart has been made sales manager of the Signal Truck Corp. He was formerly district sales manager at Springfield, O., for the Kelly-Springfield Motor Truck Co., and later was branch manager of the same company at Chicago, Ill. Before joining Signal he was vice-president and general manager of the Selden Sales and Service Co., Chicago.

Frank W. Warrington has been appointed general sales manager of the Denby Motor Truck Corp., Detroit. He had previously been connected with the Denby as service manager and assistant sales manager. He left the Republic Motor Truck Co., as manager of branches to assume his new duties.

Earl W. Webb, general attorney in charge of legal department of General Motors, at Detroit, has been given the added duties of head of the real estate department, advisory staff. In his new duties, Mr. Webb succeeds the late Charles McNamee.

V. P. Whelan has been appointed New England district sales manager for the Atterbury Motor Car Co., Buffalo, N. Y. Having been with the automobile industry himself for twenty years he joins in time to celebrate the 20th anniversary of the Atterbury Company.

H. R. Williams has been announced as director of sales and advertising by the United States Motor Truck Co., Cincinnati. Mr. Williams comes from the Berkshire Products Co., Pittsfield, Mass., where he has seen service as vice-president and director of sales.

K. M. Wharry, formerly connected with the Chicago, Burlington & Quincy Railroad Freight and Traffic Department, later general freight and traffic manager of the Missouri Pacific lines, has succeeded W. R. Powe as general manager of the freight and traffic department of the Automotive Equipment Association.



Frank L. Parrill

Formerly advertising manager of the Cole Motor Car Company, has joined the field staff of the CHILTON COMPANY. Mr. Parrill will represent the COMMERCIAL CAR JOURNAL, making his headquarters at Indianapolis. For several years Mr. Parrill has been closely identified with advertising in the automotive field. His experience includes service with the Homer McKee Advertising Agency, and previously with the Willys-Knight organization.



George M. Stadelman

Who has succeeded E. G. Wilmer as president of the Goodyear Tire & Rubber Co., Akron, Ohio. Mr. Stadelman joined the company in its early days and continued his direction of the sales policies through its growth to its present gigantic proportions. Mr. Wilmer is chairman of the board.



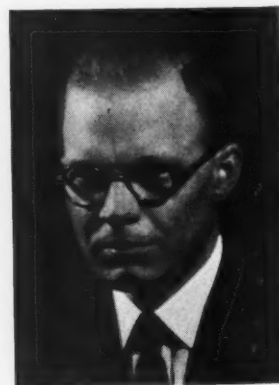
H. E. Westmoreland

Who has been announced as sales manager of the McQuay-Norris Manufacturing Co., of St. Louis, Indianapolis and Connersville. He was southwestern manager at Dallas, Tex., for nine years, and for the past year has been in the sales department of the company's general offices.



Morris Metcalf

Recently elected treasurer of the American Bosch Magneto Corp., of Springfield, Mass. Mr. Metcalf comes from the Guaranty Trust Company of New York. His rather broad experience in industrial and financial lines makes him a valuable acquisition to the Bosch staff.



William A. Johnson

Manager of Goodrich automobile tire sales for the past several years who becomes manager of merchandising of the tire division. Mr. Johnson has long been identified with the tire industry and in his new position will be able to give a closer study to the current problems in the trade.

Roll Call

of White Truck Fleets

In Active Service

(10 or More Trucks)



THIS year's Roll Call of White Truck Fleets covers thirteen years of transportation experience by the foremost truck owners in the country. Nothing like it in *extent and quality* of ownership has ever been published by any other maker. It is impressive evidence of *White leadership*.

The list shows a steady, yearly growth of individual fleets in every line of trucking service, among a class of owners who *know* motor trucks. It includes only fleets of ten White Trucks or more, totaling 21,773. There are now 57,678 Whites in fleets of all sizes, and a host of single trucks.

The Roll Call is Industry's endorsement of White Truck performance.

	1910	1912	1913	1914	1915	1916	1917	1918	1919	1920	1921	To-day
Abbotts Alderney Dairies, Inc.	0	0	1	4	6	7	8	8	14	17	30	44
Abraham & Straus	0	0	0	0	0	0	10	10	17	45	45	47
Acme Cash Stores	0	0	1	3	3	4	5	10	10	12	12	12
J. N. Adam & Company	0	6	8	8	8	8	8	10	17	19	28	32
City of Akron, Ohio	0	0	1	1	1	4	5	8	11	17	15	16
Akron Pure Milk Company	0	0	2	3	6	6	6	6	13	13	13	10
Akron Storage & Contracting Co.	0	0	0	0	2	5	8	10	10	10	10	10
Alabama Coca Cola Bottling Co.	0	0	0	0	0	1	1	3	6	7	13	13
B. Altman & Company	0	8	8	33	67	92	92	93	93	94	94	94
American Agricultural Chemical Co.	0	1	1	1	1	5	8	9	17	38	38	40
American Ambulance Field Service	0	0	0	0	0	1	22	22	22	22	22	22
American Bakery Company	0	0	0	0	0	0	0	0	2	10	12	12
American Can Company	0	4	7	8	8	33	56	66	70	88	88	90
American Fruit Growers, Inc.	0	0	0	0	0	0	0	0	0	11	11	11
American Ice Company	0	0	0	0	0	1	2	7	8	15	15	15
American News Company	0	0	0	1	2	2	2	2	6	10	15	18
American Petroleum Company	0	0	0	0	0	0	12	26	26	29	29	29
American Power & Light Company	0	0	0	0	0	1	2	3	9	13	15	26
American Relief Admin. (Russia)	0	0	0	0	0	0	0	0	0	10	20	20
American Railway Express	0	3	14	22	27	88	98	111	121	128	186	274
American Red Cross Society	0	0	0	0	0	0	86	122	123	123	123	123
American Steel & Wire Company	0	1	5	5	6	10	16	20	23	29	30	30
American Stores Company	0	2	9	14	14	15	29	37	81	97	80	80
American Tobacco Company	0	0	1	2	3	4	9	14	14	17	19	19
American War Relief Clearing House	0	0	0	0	2	18	32	32	32	32	32	32
Ammen Transportation Company	0	2	7	8	9	11	11	32	32	32	32	32
Anchor Cartage Company	0	0	0	0	0	0	0	0	0	0	0	0
Anderson Bros.	0	0	0	0	0	0	0	0	0	0	0	0
Anderson Transportation Company	0	0	0	0	0	0	0	0	0	0	0	0
Anheuser-Busch, Inc.	0	0	0	0	1	17	19	19	20	26	28	27
Arctic Ice & Coal Company	0	0	0	0	0	0	0	0	0	0	0	0
State of Arizona	0	0	0	0	0	0	0	0	0	0	0	0
Arlington Mills	0	1	1	1	2	2	11	12	13	15	19	19
*Armour & Company	0	30	51	63	84	165	226	259	309	370	395	364
*Associated Bell Telephone Companies	0	6	30	46	84	311	447	477	517	782	806	993
*Associated Dry Goods Corporation	0	8	13	23	29	37	40	88	126	126	128	129
City of Atlanta	0	6	8	10	10	11	11	15	15	21	29	42
Atlanta Baggage & Cab Company	0	0	0	0	0	0	0	6	10	10	15	23
Atlanta Chero-Cola Bottling Co.	0	0	0	0	0	0	0	0	0	0	0	0
Atlanta Coca Cola Bottling Co.	0	0	0	0	0	0	0	0	0	0	0	0
Atlantic Ice & Coal Corporation	0	0	15	15	15	20	27	34	38	42	52	68
Atlantic Refining Company	1	9	31	67	86	184	275	334	345	435	440	462
Atlas Powder Company	0	0	0	0	0	0	0	0	0	0	0	0
Augusta Chero-Cola Bottling Co.	0	0	0	0	0	0	0	1	3	7	7	11
Austin Nichols & Company	0	0	0	0	0	0	0	0	0	18	23	31
The Bailey Company	0	3	6	6	13	16	17	20	25	35	34	37
Oliver H. Bair Company	0	0	0	5	6	6	9	9	11	11	11	11
City of Baltimore	0	4	7	14	14	29	30	31	34	36	38	39
L. Bamberger & Company	0	0	0	0	0	0	0	0	0	4	4	13
Barker Brothers, Inc.	0	0	0	0	0	0	0	0	0	1	13	18
Barnsdall Refining Company	0	0	0	0	0	0	0	0	0	2	5	8
The Barrett Company	0	0	0	0	0	11	17	19	21	21	22	24
W. J. Barry	0	1	1	1	2	3	5	7	7	7	7	9
Bellevue and Allied Hospitals	0	0	1	3	9	15	19	19	24	24	24	24
Bernheimer's	0	2	3	3	3	3	3	3	10	10	10	10
Best & Company	0	0	0	0	0	0	0	0	18	25	24	27
The Samuel Bingham's Sons Mfg. Co.	0	0	1	1	2	3	3	5	5	5	5	10
William Bingham Company	0	0	0	0	0	16	17	20	23	22	22	22
Birmingham Chero-Cola Bottling Co.	0	0	0	0	0	0	2	2	27	31	32	32
City of Birmingham	0	0	0	0	0	0	0	0	2	3	4	21
Block & Kuhl Company	0	0	0	0	1	3	5	9	14	16	16	17
Bloomingdale Brothers	0	0	0	0	0	0	0	0	8	27	27	32
Boggs & Buhl, Inc.	0	10	18	23	24	24	24	23	32	27	29	29
The H. C. Bohack Company	0	0	0	0	0	0	0	0	1	1	1	3
Bohlen-Huse Coal & Ice Company	0	5	7	7	7	7	10	10	10	10	10	10
Thomas P. Bonner	0	0	0	0	0	0	0	0	0	0	0	0
The Borden Company	0	0	0	0	0	0	0	0	0	1	5	6
Henry Bosch Company	2	8	9	10	10	11	12	12	12	13	13	13
City of Boston	0	9	12	17	18	18	19	22	22	30	32	34
Boston Coca-Cola Bottling Company	0	0	0	0	0	0	0	0	2	10	10	10
Boston Elevated Railway Company	0	0	0	0	0	0	0	0	1	28	36	41
Boulevard Transportation Company	0	0	0	0	0	0	0	0	1	2	2	5
Bourne-Fuller Company	0	0	2	3	4	6	7	7	8	10	10	12
Bowman Dairy Company	0	0	0	0	0	0	0	0	0	0	0	0
Bradford Baking Company	0	0	9	20	25	26	26	26	29	31	31	32
The Brandt Company	0	0	0	0	0	1	10	25	25	34	41	41
Brewer & Company, Inc.	0	0	0	2	3	5	6	7	8	9	10	10
Samuel Briggs	0	0	0	0	0	0	0	0	0	0	0	0
Broadway Department Store	0	0	0	0	0	0	0	0	0	0	0	0
Brooklyn Transportation Company	0	0	0	0	0	0	0	0	7	16	20	21
Brooklyn Alcatraz Asphalt Company	0	0	2	9	9	11	11	11	11	11	11	10
Brooklyn Dairy Eagle	0	0	0	0	0	0	0	0	0	0	0	0
Brooks Oil Company	0	0	0	0	0	0	0	0	0	0	0	0
Bry-Block Mercantile Company	0	0	0	0	0	0	0	0	10	10	10	12
Buckeye Pipe Line Company	0	0	0	0	0	0	0	0	0	0	1	12
Budwine Bottling Company	0	0	0	0	0	0	0	0	0	0	0	0
Buffalo Taxi Service & Sightseeing Co.	0	0	0	0	0	0	0	0	0	0	0	0
Bullock's	0	0	4	5	8	8	8	8	8	9	10	10
M. Burkhardt Brewing Company	0	0	2	2	2	5	5	5	11	11	11	10
P. H. Butler Company	0	0	1	1	1	1	1	1	1	1	1	1
Butler Brothers, Inc.	0	0	0	0	0	0	0	0	0	0	0	0
Cable Draper Baking Company	0	0	0	0	0	0	0	0	0	0	0	0

Continued on Following Pages

Continued From Preceding Page

	1910	1912	1913	1914	1915	1916	1917	1918	1919	1920	1921	To-day
Caddo Parish, Louisiana	0	0	0	0	0	2	13	13	13	13	13	13
State of California	0	0	0	0	1	4	4	4	4	7	21	52
California Baking Company	0	0	0	0	0	13	17	21	21	26	23	
California Central Creameries, Inc.	0	0	0	0	0	6	6	11	14	14	14	
California Packing Corporation	0	0	0	0	0	4	7	11	11	13	13	
California Petroleum Company	0	0	0	0	0	2	2	2	2	5	7	13
California Transit Company	0	0	0	0	0	0	0	0	17	25	42	
California Truck Company	0	0	0	0	2	3	3	4	8	13	17	17
J. Calvert's Sons	0	0	0	0	0	0	0	0	6	10	10	10
Wm. Cameron Company	0	0	0	0	0	0	0	0	1	3	8	10
The Campbell System	0	0	0	0	0	0	0	0	2	12	17	26
Canfield Oil Company	0	0	0	0	0	0	0	0	10	13	15	19
Canton Provision Company	0	0	0	1	2	3	4	6	10	11	11	11
Canton Storage & Transfer Company	0	0	0	0	0	1	7	9	11	15	11	15
Carbon Coal Company	0	0	0	0	0	2	5	6	8	11	12	10
R. E. Carey Company	0	0	0	0	0	0	0	0	0	0	0	12
Carolina Public Service Company	0	0	0	0	0	0	0	0	11	11	11	11
J. B. Carr Biscuit Company	0	0	1	1	3	3	4	7	12	12	12	
Carstens Packing Company	0	0	0	0	0	0	0	0	10	10	10	13
Carter Oil Company	0	0	0	0	0	1	1	4	10	15	18	18
Central Public Service Company	0	0	0	0	0	0	0	0	1	2	3	9
Central Torpedo Company	0	0	0	0	0	0	0	0	1	6	9	11
W. A. Chambers Company	0	0	0	0	0	2	5	7	10	10	10	11
Chandler & Rudd Company	0	0	0	0	0	0	0	0	10	21	28	58
Chapin-Sacks Corporation	0	0	0	0	0	0	0	0	10	10	10	10
*Chero-Cola Bottling Companies	0	0	0	4	6	30	57	66	74	99	105	155
The Chero-Cola Company	0	0	0	0	0	0	0	0	1	32	76	76
Check-Nail Coffee Company	0	0	0	0	0	0	0	0	5	12	12	
Chicago American & Herald Examiner	0	0	0	0	0	0	0	0	14	19	26	29
Chicago Fire Insurance Board	5	11	13	13	13	13	13	13	13	13	13	13
Chicago North Shore & M.H. R. R. Co.	0	0	0	0	0	0	0	0	0	3	12	
Chicago Towel Company	0	0	0	0	0	0	0	0	1	1	4	9
Cia Abastecedora de Leche	0	0	0	0	0	0	0	0	6	8	10	10
Cincinnati Motor Terminals Company	0	0	0	0	0	0	0	0	2	16	16	16
City Baking Company	0	0	0	0	0	0	0	0	0	14	14	20
City of Chicago	0	1	1	1	2	3	4	7	13	13	15	
City Ice & Fuel Company (Cincinnati)	0	0	0	0	0	0	0	0	7	13	13	15
City Ice & Fuel Company (Cleveland)	0	1	3	3	3	5	8	11	14	17	18	
Clearing House Parcel Delivery Co.	0	0	0	0	0	0	0	0	14	15	16	17
City of Cleveland	0	15	18	19	23	32	36	43	47	53	53	53
Cities Service Company	0	0	0	0	0	0	0	0	10	16	22	34
Cleveland-Akron Bag Company	0	14	15	19	21	39	45	54	53	53	53	53
Cleveland-Akron Bus Line Company	0	0	0	0	0	0	0	0	10	14	15	34
Cleveland Builders Supply & Brick Co.	0	0	0	0	0	0	0	0	51	57	64	71
Cleveland Coca Cola Bottling Company	0	0	0	0	0	0	0	0	21	22	28	40
Cleveland Electric Illuminating Co.	0	0	0	0	6	17	23	23	40	48	49	60
The Cleveland Press	0	0	0	0	0	0	0	0	10	10	14	14
Cleveland Provision Company	0	0	0	0	0	0	0	0	15	29	34	35
Cleveland Railway Company	0	0	0	0	0	0	0	0	4	10	15	21
Cleveland Transfer Company	0	0	0	0	0	0	0	0	19	19	25	22
Cleveland & Sandusky Brewing Co.	0	1	1	2	3	10	15	17	24	29	30	30
*Coca Cola Bottling Companies	0	11	24	34	47	78	91	103	198	220	301	
The Coca Cola Company	0	0	0	0	0	0	0	0	15	23	34	53
The Coca Cola Company (Canada)	0	0	0	0	0	0	0	0	2	13	30	58
J. C. Collins	0	0	0	0	0	0	0	0	8	12	12	12
Colonial Ice Cream Company	0	0	0	0	0	0	0	0	0	20	38	26
Columbia Ice & Ice Cream Company	0	0	0	0	0	0	0	0	0	1	1	13
Columbia Stage Company	0	0	0	0	0	0	0	0	5	6	9	12
L. H. Colvin	0	0	0	0	0	0	0	0	0	0	0	10
R. H. Comey Company	0	0	0	0	0	0	0	0	12	14	14	14
Commercial Transfer Company	0	0	0	0	0	0	0	0	7	10	13	13
The Connecticut Company	0	0	0	0	0	0	0	0	0	2	12	
Consolidated Companies	0	0	0	0	0	0	0	0	1	12	15	18
Consolidated Rendering Company	0	0	0	0	0	0	0	0	17	30	32	34
Consumers Bread Company	0	0	0	0	0	0	0	0	0	0	0	13
Consumers Dairy Company	0	0	0	0	0	0	0	0	0	1	7	13
Continental Oil Company	0	2	2	3	4	19	25	34	38	81	82	90
Cosden Oil & Gas Company	0	0	0	0	0	0	0	0	6	10	16	11
Cottage Creamery Company	0	0	0	0	0	0	0	0	7	12	12	12
Crescent Forwarding & Transfer Co.	0	0	0	0	0	0	0	0	5	25	37	40
Crew Levick Company	0	0	0	0	0	0	0	0	10	14	14	14
Cuban Government	0	0	0	0	0	0	0	0	43	58		
Cudahy Packing Company	0	2	6	8	10	21	24	27	42	58		
John T. Cunningham	0	0	0	0	0	0	0	0	1	1	1	16
Dahl-Campbell Grocery Company	0	0	0	0	0	0	0	0	3	7	11	11
Dannemiller Grocery Company	0	0	0	0	0	0	0	0	12	12	12	12
Darling & Company	0	2	2	2	3	6	12	12	12	12	12	12
Thomas D'Attilio	0	0	0	0	0	0	0	0	4	7	12	12
Davlsen Cartage Company	0	0	0	0	0	0	0	0	0	0	0	12
Day Brothers	0	0	0	0	0	0	0	0	1	2	9	15
The Dayton Company	0	0	0	0	0	0	0	0	0	0	0	13
Denver Gas & Electric Light Company	0	0	0	0	0	0	0	0	0	3	8	15
Dill & Collins	0	0	0	0	0	0	0	0	5	6	10	11
Dominion of Canada	0	0	43	43	43	43	43	43	43	43	43	43
Drake Brothers	0	0	2	2	2	2	2	2	9	13	15	15
East Ohio Gas Company	0	0	1	3	5	10	11	11	13	16	17	
East Side Mill & Lumber Company	0	0	0	0	0	0	0	0	1	1	6	10
Eastern Torpedo Company	0	0	0	0	0	0	0	0	15	20	27	28
T. Eaton Company, Ltd.	13	14	15	15	20	20	20	20	20	20	20	20
*Electric Bond & Share Company	0	0	0	0	0	2	7	8	9	12	15	18
Electric Package Agency	0	0	0	0	0	0	0	0	6	9	10	11
Emerick Motor Bus Company	0	0	1	5	9	11	14	16	16	16	12	18
Empire Gas & Fuel Company	0	0	0	0	0	0	0	0	108	117	117	117
Empire State Dairy Company	0	0	0	0	0	0	0	0	6	12	13	13
Erle Service Company	0	0	0	0	0	0	0	0	11	15	15	15
A. J. Evans	0	0	0	0	0	0	0	0	0	14	21	21
S. Ewart & Company	0	0	0	0	0	0	0	0	6	9	13	13
The Fair	0	0	0	0	0	0	0	0	0	12	12	12
The Fairbanks Company	0	0	0	0	0	0	0	0	10	13	13	13
Fair Haven Coal Company	0	0	0	0	0	0	0	0	1	1	10	11
Fairmont Creamery Company	0	0	0	0	0	0	0	0	1	11	12	13
Fayette Baking Company	0	0	0	0	0	0	0	0	0	10	10	13
Fenway Garage Company	0	19	19	29	29	39	39	39	37	30	30	30
Wm. Filene's Sons Company	0	0	0	0	0	0	0	0	2	10	12	12
Firestone Tire & Rubber Company	0	0	0	0	0	0	0	0	12	16	16	16
Fischer Baking Company	0	0	0	0	0	0	0	0	0	4	6	11
The Fleischmann Company	0	0	0	0	0	0	0	0	1	3	4	11
Florida Motor Transport Company	0	0	0	0	0	0	0	0	11	16	23	23
Flour State Baking Company	0	0	0	0	0	0	0	0	0	0	0	11
County of Fulton, Georgia	0	0	0	0	0	1	2	3	3	3	5	11
Fly & Hobson Company	0	0	0	0	0	0	0	0	10	10	10	12
Foster & Kleiser, Inc.	0	4	4	8	10	10	10	10	10	10	10	17
Frank & Seder	0	0	0	0	0	0	0	0	2	19	21	21
Franklin Ice Cream Company	0	0	0	0	0	0	0	0	0	5	13	20
Harry V. Frank	0	0	0	0	0	0	0	0	6	16	16	16
Frederick & Nelson, Inc.	0	0	3	7	9	10	13	18	21	23	25	25
W. P. Fuller & Company	0	0	0	0	0	0	0	0	1	3	6	12
Fulfillment Auto Bus Company	0	0	0	0	0	0	0	0	3	3	5	7
General Baking Company	0	0	1	1	1	1	10	25	43	68	81	114
General Fire Extinguisher Company	0	0	2	2	2	3	4	5	6	10	11	10
General Motor Truck Corporation	0	0	0	0	0	0	0	0	20	22	22	22
General Petroleum Company	0	0	0	0	0	0	0	0	8	15	34	42
Georgia Railway & Power Company	0	1	3	7	7	18	22	24	24	29	34	42
Gimbel Brothers, Inc. (Milwaukee)	0	0	2	3	4	6	7	7	13	15	15	13
Gimbel Brothers, (New York)	24	46	59	62	62	71	71	71	65	68	68	68
Gimbel Brothers, (Philadelphia)	0	0	0	0	0	0	0	0	13	16	28	44
Glacier Park Transportation Company	0	0	0	10	20	22	23	23	24	24	30	30
Globe Grain & Milling Company	0	1	2	2	2	3	3	5	16	17	18	20
Gloucester Auto Bus Company	0	0	0	0	0	0	0	0	0	15	13	13
City of Gloucester	1	0	0	0	0	0	0	0	1	5	13	13
Adolf Gobel, Inc.	0	0	0	0	0	0	0	0	10	30	35	41
Goff-Kirby Company	0	0	0	0	0	0	0	0	3	8	8	11
Golden Sheaf-Romas Baking Company	0	0	0	0	0	0	0	0	0	13	18	20
J. Goldsmith & Sons Company	0	3	4									

(10 or More Trucks)

	1910	1912	1913	1914	1915	1916	1917	1918	1919	1920	1921	22
Sanders & Brother, Inc.	0	0	0	0	0	0	0	0	3	10	10	13
Samuelville Coca Cola Bottling Co.	0	0	0	2	5	5	5	5	0	0	10	10
San Diego Consolidated Gas & Elec. Corp.	0	0	0	0	0	0	3	3	3	3	6	13
Sanger Brothers	0	7	7	7	7	7	8	8	13	13	13	13
San Francisco City and County	0	1	3	3	3	4	4	4	4	14	25	29
San Francisco Municipal Railway	0	0	0	0	0	0	0	0	7	10	10	10
San Joaquin Light & Power Corp.	0	0	0	0	0	0	2	2	14	18	18	23
San Joaquin Baking Company	0	0	2	3	4	5	6	7	7	11	13	15
Santa Ana Commercial Company	0	0	0	0	1	1	1	2	4	6	9	11
Savage-Schleld Company	0	0	0	0	0	0	0	0	0	0	0	0
Schulze Baking Company	1	9	15	17	22	23	26	31	35	35	41	59
Nathan Schweitzer Company	0	0	0	0	0	0	0	0	0	4	9	11
City of Seattle	0	0	1	1	1	1	1	1	1	1	10	13
Seven Baker Brothers	0	0	0	0	0	0	0	0	0	17	18	18
Shaeffer-Bell Company	0	0	0	0	0	0	0	0	2	4	11	11
Shaffer Oil & Refining Company	0	0	0	0	0	0	0	0	1	43	52	56
Dennis Sheen Transfer Company	0	0	0	0	0	0	0	3	10	19	21	26
Shell Company of California	0	0	0	0	0	0	0	0	0	0	0	0
Shepard Stores	0	0	0	1	1	2	4	4	7	7	10	11
Sherman, Clay & Company	0	0	0	0	1	1	2	2	5	7	9	10
The John Shillito Company	0	0	0	0	0	0	0	0	7	13	14	15
Steffel Company	0	0	0	0	0	0	0	0	0	0	0	0
Franklin Simon & Company	0	0	3	6	10	14	14	17	18	19	19	26
Skelly Oil Company	0	0	0	0	0	0	0	0	0	21	23	25
John A. Sloan	0	0	0	0	0	0	0	0	0	0	10	22
W. & J. Sloane	13	15	17	17	21	23	23	23	26	31	31	31
Sonoma County, California	0	0	0	0	0	0	0	0	1	2	10	10
Southeastern Express Company	0	0	0	0	0	0	0	0	0	0	109	116
Southern Oil Corporation	0	0	0	0	0	0	0	0	3	15	16	13
Southern Pacific Company	0	0	0	0	0	0	0	0	0	0	0	0
The W. P. Southworth Company	1	5	7	8	9	9	9	9	9	9	9	14
Spear & Company	0	1	9	13	14	15	22	23	27	22	34	35
Sperry Flour Company	0	0	0	0	0	0	1	1	7	9	9	14
City of Springfield, Mass.	0	0	0	0	0	0	1	2	2	2	2	2
J. H. & L. Stadler Fertilizer Company	0	1	1	3	3	4	4	4	4	11	13	13
Otto Stahl, Inc.	0	0	0	0	0	0	0	5	13	16	17	20
Standard Brewing Company	0	0	1	1	1	3	5	5	7	11	13	12
*Standard Gas Electric Company	0	0	0	0	0	0	0	0	0	0	0	0
Standard Oil Company of California	1	4	6	7	26	67	97	111	188	214	243	251
Standard Oil Company of Indiana	1	5	9	59	122	168	201	214	213	181	181	182
Standard Oil Company of Kentucky	0	2	4	5	9	38	75	121	349	360	398	420
Standard Oil Company of Louisiana	0	0	0	0	0	0	0	0	3	91	100	113
Standard Oil Company of Nebraska	0	0	0	5	11	17	17	17	18	22	24	24
*Standard Oil Company of New Jersey	0	1	1	1	1	3	30	65	65	57	68	82
Standard Oil Company of New York	2	18	35	68	113	230	363	450	520	622	649	727
Standard Oil Company of Ohio	0	0	0	10	12	28	34	42	75	83	83	83
Standard Sanitary Manufacturing Co.	0	2	3	3	4	4	6	10	15	23	29	33
Sterling & Welch Company	2	7	7	7	8	8	11	14	14	16	18	19
Stern Brothers	0	8	18	18	18	21	22	22	25	39	40	42
John Stercker	0	0	0	0	0	6	6	6	6	10	10	10
Stewart & Company	1	2	4	6	7	8	8	8	12	12	13	17
Stewart Taxi Service Company	0	0	0	0	0	18	29	43	42	50	52	50
Stoll Oil Refining Company	0	0	0	0	0	0	0	0	2	9	10	10
*Ston & Webb Interests	0	0	0	0	0	0	15	22	35	35	35	35
Strawbridge & Clothier	0	0	2	4	4	9	15	15	15	20	23	33
Stroehmann Baking Company	0	0	2	2	2	10	10	11	14	27	25	25
Summerfield Company	0	0	0	0	3	5	5	5	5	5	10	10
Sun Company	0	0	0	0	0	0	0	0	10	10	19	19
*Swift & Company	0	0	2	2	10	101	109	127	164	213	227	239
Swift Canadian Company, Ltd.	0	0	1	2	2	2	6	7	11	17	17	18
Tacoma Bottling Works	0	0	0	0	0	0	6	10	15	17	17	19
Taft-Kern Co. Cal. School District	0	0	0	0	0	0	0	0	0	0	0	0
The Taxi Company	0	0	0	2	4	13	13	14	14	14	14	14
Taylor Bros. Auto Trucking Company	0	0	0	0	0	0	0	0	0	2	4	11
Wm. Taylor Son & Company	0	0	0	0	0	2	4	4	24	34	35	36
Techer Transfer Company	0	0	0	0	0	0	0	0	4	7	7	7
Terre Haute Brewing Company	0	0	0	2	5	6	6	6	7	9	10	10
Telling-Belle Vernon Company	0	4	4	9	11	11	13	20	42	61	69	75
The Texas Company	0	0	0	0	9	11	11	11	64	110	142	172
Texas Pacific Coal & Oil Company	0	0	0	0	0	0	0	0	25	25	25	25
Theurer Norton Provision Company	0	0	0	0	0	1	2	6	8	12	12	13
Tide Water Oil Company	0	0	0	0	0	0	3	4	27	28	35	36
City of Tokyo, Japan	0	0	0	0	0	0	0	0	0	1	11	12
City of Toronto	0	0	0	0	0	0	0	0	0	7	11	11
Transcontinental Oil Company	0	0	0	0	0	0	0	0	0	11	25	33
Tribune Publishing Company (Oakland)	0	0	0	0	0	0	0	0	0	0	0	0
Twin City Motor Bus Company	0	0	0	0	0	0	0	19	19	21	30	37
Union Electric Light & Power Company	0	0	0	0	0	0	0	0	0	12	15	15
Union Carbide & Carbon Co. Interests	1	1	2	3	6	16	18	21	20	22	22	22
Union Gas Company of California	0	0	10	22	43	156	216	251	389	534	621	621
Union Gas & Electric Company	0	0	0	0	0	0	1	1	19	21	27	32
Union Transfer Company (Fremont)	0	0	0	0	0	0	0	0	0	0	5	10
Union Transfer Company (Philadelphia)	0	0	0	0	0	1	11	12	12	12	12	12
Union Wholesale Lumber Company	0	0	0	0	0	0	6	6	11	12	12	12
United Drug Company	0	0	0	0	0	0	0	0	5	20	20	20
United Electric Railways Company	0	0	0	0	0	0	0	0	0	0	0	0
*United Gas Improvement Co. Interests	0	0	2	8	15	22	44	40	47	53	56	11
United Natural Gas Company	0	0	0	0	0	0	0	0	0	10	11	13
United Railways & Electric Company	0	0	0	0	0	0	0	0	3	13	15	19
United Shoe Machinery Corporation	0	0	0	0	0	0	0	0	1	10	10	12
United States Bakery	0	0	0	0	0	2	18	18	20	20	20	20
United States Rubber Company	0	0	1	2	5	5	9	14	16	19	24	25
United States Post Office Department	0	0	21	28	104	132	298	445	463	485	665	665
*United States Steel Corp. Interests	0	1	1	2	3	5	12	17	17	20	20	30
United States Trucking Corporation	0	0	0	0	0	0	13	20	20	31	31	31
Uplake Lumber & Coal Company	0	0	0	0	0	0	3	5	12	12	12	12
Valley Transit Company	0	0	0	0	0	0	2	3	8	14	14	16
Van Dorn Iron Works Company	0	0	0	0	0	0	0	0	7	13	13	13
F. G. Vogt & Sons, Inc.	0	0	0	0	0	0	15	16	17	14	14	14
John Wanamaker	0	0	0	0	0	6	27	37	37	63	84	89
Ward Baking Company	0	0	0	0	0	12	53	76	76	78	84	86
Washington Bakeries Corporation	0	0	0	0	0	0	0	0	0	0	0	0
Washington Railway & Electric Co.	0	0	0	0	0	0	0	0	0	0	0	0
Raphael Weill & Company	0	0	0	0	10	10	12	12	20	20	20	20
Western Electric Company	0	2	4	5	5	9	15	19	24	28	32	39
Western Meat Company	0	0	0	0	0	0	2	11	12	27	24	26
Western Motor Transfer Company	0	0	0	0	0	0	0	0	0	0	0	0
West India Oil Company	0	4	7	7	7	7	7	7	7	7	7	10
Westinghouse Electric & Mfg. Co.	0	0	0	0	0	1	1	3	4	8	9	11
J. G. White & Company Interests	0	1	1	2	4	6	7	7	7	8	10	11
Whitaker-Glesner Company	0	0	0	0	0	0	0	0	9	15	15	15
R. H. White Company	0	0	0	0	0	4	13	13	13	11	11	11
White Taxi Company	0	0	0	0	0	0	24	24	25	43	37	37
White Transit Company, Inc.	0	1	2	6	9	19	29	31	36	44	49	45
Lloyd A. Whitener	0	0	0	0	0	0	0	0	0	0	0	0
Whiting-Mead Commercial Company	0	0	0	0	0	0	0	0	1	1	2	10
W. I. A. T. Corporation	0	0	0	0	0	0	3	4	4	4	8	10
W. A. Wieboldt Company	0	0	0	0	0	0	0	0	0	0	5	12
W. E. Wiener & Company	0	0	0	0	0	0	0	0	0	0	0	0
Willard's Chocolates, Ltd.	0	0	0	0	0	0	0	0	0	12	14	14
Wilson & Company	0	0	0	0	0	1	1	2	22	32	31	33
Winchester Laundry	0	0	1	1	1	1	1	1	4	10	12	10
Wm. Winkler (Steele-Wedeles)	0	0	0	0	0	0	0	0	10	12	13	13
State of Wisconsin	0	0	0	0	0	0	0	0	14	15	15	15
Wise Brothers	0	0	0	0	0	0	0	0	0	4	10	11
Wofford Oil Company	0	0	0	0	0	0	1	1	4	13	11	11
Woodward & Lorthop	0	1	3	3	4	7	13	14	13	15	17	17
Wooling & Brewing Company	0	0	0	0	0	0	0	0	0	0	0	0
Gco. Worthington Company	0	1	2	2	2	4	8	8	10	15	15	16
Wouters Laundry Company	0	6	10	10	10	10	10	10	10	10	10	10
Yellowstone Park Transportation Co.	0	0	0	0	0	0	106	112	112	135	150	161
Yosemite National Park Company	1	7	8	8	8	8	8	8	8	8	8	8
Zettelmeyer Coal Company	0	1	2	2	3	4	5	10	10	19	19	19
Zellerbach Paper Company	0	1	1	1	1	1	1	1	2	4	6	8

*Exclusive of subsidiary or affiliated companies individually listed

THE WHITE COMPANY, *Cleveland*

 THIS SYMBOL IN ANY ADVERTISEMENT MEANS: SEE "CHILTON AUTOMOBILE DIRECTORY" FOR COMPLETE BUYING INFORMATION

**Our
Twenty-second
Anniversary**



It was May 1, 1901, that the Heil Rail Joint Welding Co. was organized. The infant firm was hidden in a little frame building in the very midst of the busiest industrial section of Milwaukee. The newly organized company was first engaged in sheet metal work, welding and tank building. Friends of "J. R." Heil like to recall the days when he would get up at sunrise on Saturday mornings to drive his first tank wagon to the various county fairs held near Milwaukee. Later, the company were builders and erectors of structural steel.

Mr. Heil has ever since his youth been intimately acquainted with welding problems. His early experience in welding of rail joints for street car companies in London, Buenos Aires, Rio de Janeiro, and later in New York City and St. Louis, enabled him to originate the welding of compartment truck tanks for handling gasoline and oils—a form of construction now followed by manufacturers everywhere. The first welded truck tanks were manufactured by the Heil Co. in 1911.



**Our Present
Location**

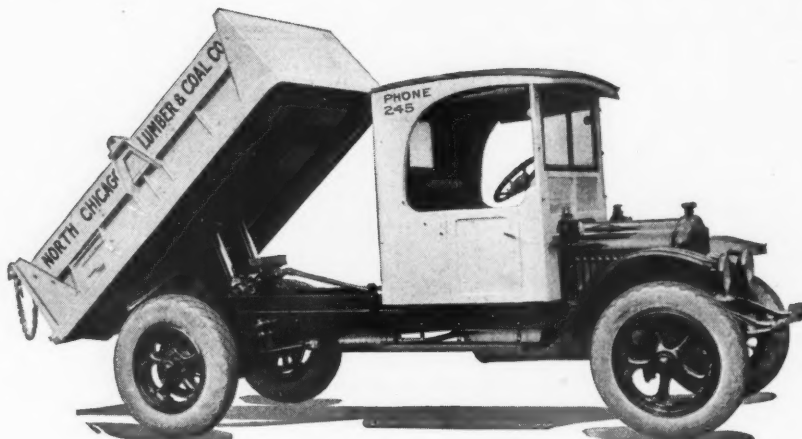
In 1908 plans for the beginning of the present Heil works were made. The five shops cover a floor space of 150,000 square feet. Seven 10-ton cranes are in operation. Because of the well-planned system of lighting in the shops, the Heil plant is often referred to as the "daylight factory."

1912 saw the first steel dump body built by the Heil Co. for the Sterling Motor Truck Co. The Heil Co. was the originator of the Steel Dump body for motor trucks. The War Department during 1917 and 1918 called on Heil for 25% of the Government steel dump body requirements.

22 YEARS of SERVICE

"Made by Heil"

is Your Guarantee of **QUALITY**



IS it sturdiness and absolute dependability? Heil Equipment is firmly established on 22 years of proven performance. Is it long life? Heil Equipment built ten years ago is still in service. Is it speed you want? Heil Hydro Hoists dump the heaviest load in a few seconds.

All in all, you want Quality Equipment—equipment that does what you want it to do; that serves under the most severe strains; that requires no attention; that is reasonably priced; and **THAT** is Heil Dumping Equipment.

Wire for our new literature and prices.

THE HEIL CO.

1143 Montana Avenue

Milwaukee, Wisconsin

New York
Chicago
Denver
St. Paul
San Francisco



Roswell, New Mexico

Washington, D. C.
Cleveland
Pittsburgh
Seattle
Sioux City



THIS SYMBOL IN ANY ADVERTISEMENT MEANS: SEE "CHILTON AUTOMOBILE DIRECTORY" FOR COMPLETE BUYING INFORMATION



**"There's a Real Headlight
Husky, Good-looking, Big Light!"**

**DIETZ
LAMPS**

STRENGTH and lighting power are the two major essentials in a good motor truck headlight. Dietz "Sentinel" Electric Headlights possess these qualifications in marked degree, plus an unusual measure of good looks.

Dietz "Sentinel" Electric Headlights are built to last, also to floodlight the road and detect far ahead those bad places which, when driven into unseen, help to roll up replacement and repair bills on tires, chassis and power plant. Moreover, their attractive drum shape design and excellent finish contribute to the good appearance of any truck.

Builders of Trucks, Fleet Owners and Dealers should become acquainted with Dietz "Sentinel" Electric Headlights. They give better service and longer wear. Let us send you complete description and prices, also information regarding Dietz New "Ranger" Acetylene Headlights.

R. E. DIETZ COMPANY, 60 LAIGHT STREET, NEW YORK
PIONEER MAKERS OF VEHICLE LAMPS—FOUNDED 1840

JAMES BARNES, Sales Manager, Motor Truck Lamp Department, Carter Bldg., Rochester, N. Y.

DIETZ "SENTINEL" ELECTRIC HEADLIGHTS
for MOTOR TRUCKS



The Tire of Traction

Note the big rubber cogs and curl groove of the Goodrich Tractor Type Truck Tire—the newest development in a solid tire.

Your eyes see at once how they dig into soft going, and stop a sliding truck on a slippery pavement.

Here is a traction tread that lasts the whole life of the tire.

Here is the tire built to give maximum service for heavy duty trucking and long hauling.

Its performance has already outstripped the splendid service forecasted for it.

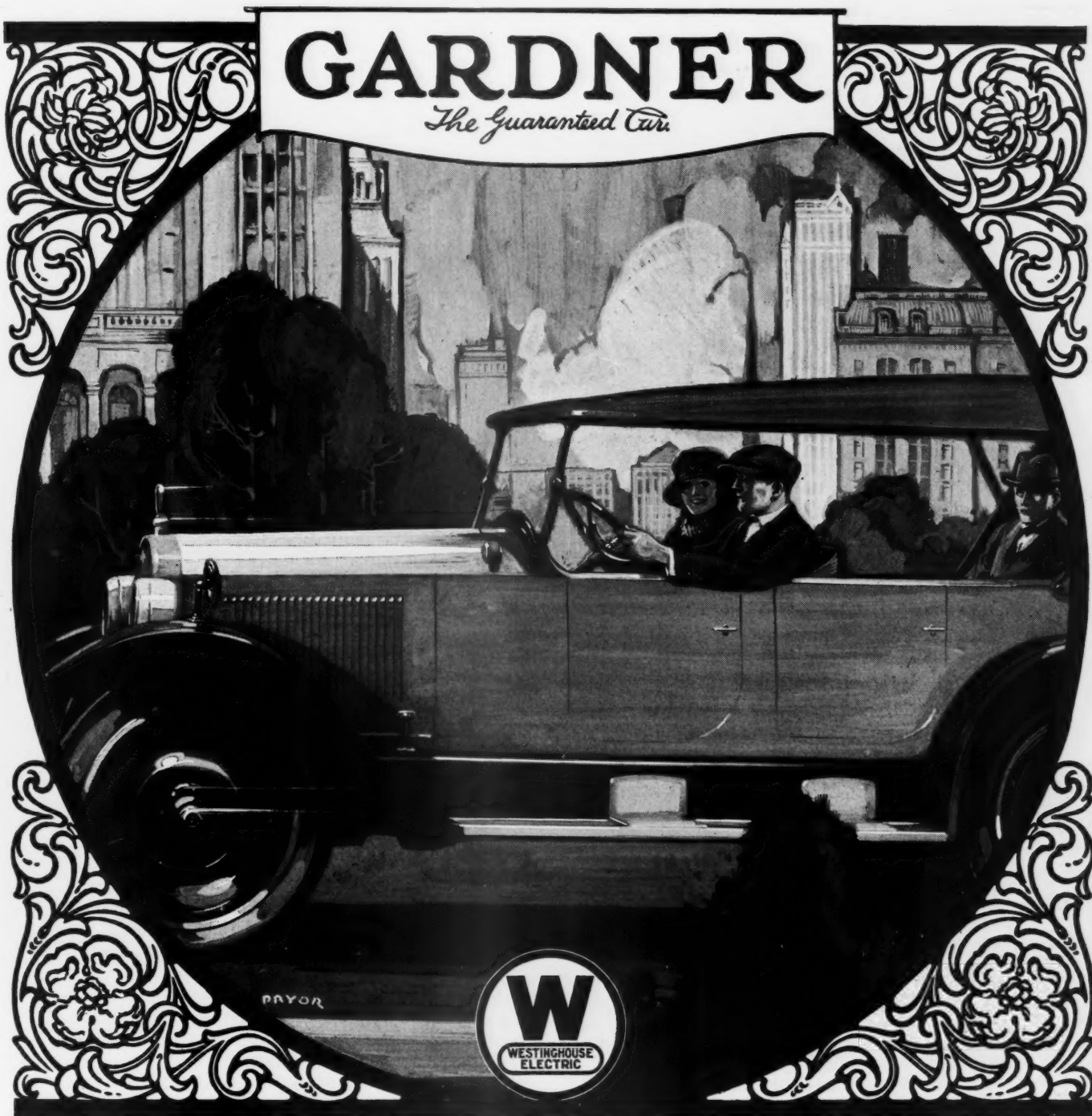
The problem of the hour is to reduce the cost of distribution. This tire does it.

We invite you to call on a Goodrich Truck Tire Distributor, and examine the exceptional features of this tire.

THE B. F. GOODRICH RUBBER COMPANY
"Best in the Long Run"

Goodrich

Tractor Type TRUCK TIRE



THE Gardner Four is truly *the* guaranteed car, for so far as a very thorough investigation can show, it is the only automobile today that is guaranteed in writing by its manufacturer for one year.

Besides the Gardner, Westinghouse Starting, Lighting and Ignition Equipment is the choice of

a large number of car builders who do not choose materials for their cars because of low purchase price. Like Gardner, their selections are guided by the reliability of the supplier and the ability of the apparatus to function properly when built into the automobile for which especially designed.

WESTINGHOUSE ELECTRIC & MANUFACTURING COMPANY
Automotive Equipment Department, Sales and Service Headquarters: 82 Worthington St., Springfield, Mass.

Westinghouse

Exclusive Territories

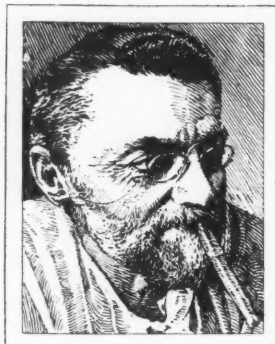
STEINMETZ ELECTRIC

Light Delivery Truck

WE are extending our distributor organization.

The distributor organization for New York and nearby states is now being completed. This with the territories previously organized will absorb our 1923 production.

We solicit inquiries from distributors and dealers in various sections of the country in order to extend our national organization, and to plan our 1924 production.



Charles P. Steinmetz
famously called "The Wizard of Schenectady"
consulting engineer General Electric Company,
chief engineer and chairman board of directors
Steinmetz Electric Motor Car Corporation.

A REMARKABLE OPPORTUNITY TO MAKE MONEY

Because of the increasing use of electric trucks for local delivery work, Steinmetz offers a proposition which cannot be overlooked. Profits in distributor territory range from \$5000 a year upward, according to territory. Our figures are based on the distributor's selling a very small percentage of the total trucks sold. With liberal advertising, and other selling activities, and with the growing use of electric trucks, the distributor will from year to year increase this percentage, and consequently his profits.

As fast as new distributor territory is opened up the selling work will be supported by an aggressive advertising campaign in leading newspapers. The campaign will be designed to develop consumer inquiries and to help put over the idea of electric trucks vs. gasoline trucks and horse-drawn vehicles for light delivery work.

In the sections where Steinmetz advertising has already appeared the results have been very gratifying.

ECONOMY—THE SALES KEYNOTE

Steinmetz trucks are sold to the consumer on the money-saving basis of their great economy of operation. For frequent-stop, short-haul work within a 50 or 60 mile radius, nothing yet has equaled the the electric truck in economy. Both gasoline truck and horse and wagon are vastly more expensive to operate.

The Steinmetz truck is a light delivery electric of new design. It was developed and tested out under the direction of Charles P. Steinmetz,

the General Electric Company's famous consulting engineer. It embodies Steinmetz's own ideas, and includes a new direct drive unit.

It is different in appearance from other electrics, being designed along the chassis lines of the light delivery gasoline truck. In addition it has every advantage of the best electric truck construction.

The Steinmetz Light Delivery Truck has been in production for more than a year, during which time many trucks have been thoroughly tested in the service of prominent American business concerns, and proven highly successful.

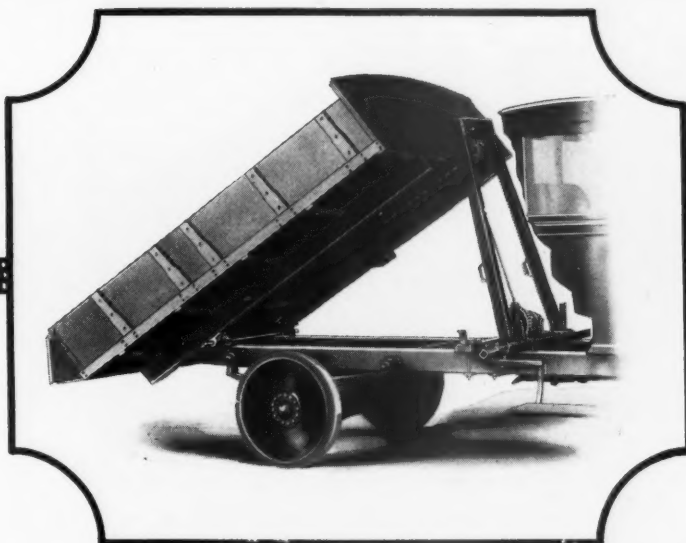
It is possible to secure a Steinmetz territory on a modest outlay. From \$3,000 to \$10,000 are required for the organization of the business. This outlay will secure exclusive territory ranging in size from one county up to large sections of a state. The distributor can subdivide and appoint associate distributors according to his needs.

DISTRIBUTOR REQUIREMENTS

If you know something about the truck or motor car business, that is a good asset; but it is not absolutely necessary. To become a Steinmetz distributor, you must have selling ability, a good clean reputation and the moderate capital necessary to finance the organization of your selling force.

If you can qualify and can see, as Steinmetz did, that electric trucks are destined to replace all other transportation means for the multi-stop work, you can make a tremendous success on this proposition. Address inquiries to

STEINMETZ ELECTRIC MOTOR CAR CORPORATION
ARLINGTON, BALTIMORE, MD.



Fits Any Chassis

A Universal Seller

Not only does the Rock Hand Hoist fit any truck chassis—it is free from trouble-making parts such as: Rollers, guides, springs, etc.

This high-grade hoist is quickly installed by means of clips that eliminate the necessity of drilling holes in the frame.

Surprising ease of operation has been secured by:

Providing all bearings with grease-packed lubrication pockets—which insure free movement of all moving parts.

Winding the Extra Flexible Plow Steel Cable on a drum equipped with spiral grooves—which automatically prevent over-lapping of cable in winding.

Using a ratchet to hold load in any position; and a brake which permits quick and effortless lowering of body after load is discharged.

This 215 lb. hoist occupies only 9" of space. Dumps up to a 3½ ton load in about one minute. Is constructed throughout so as to give your customers lasting satisfaction.

And it sells complete with body hinge for only \$85.00.

Ask us how this high-grade hoist will help you increase truck sales. Write to

ROCK MANUFACTURING CO., Waterloo, N. Y.

ROCK HAND HOIST

SIMPLE - POWERFUL - DURABLE -

Price Complete Only

\$85⁰⁰

⌚ THIS SYMBOL IN ANY ADVERTISEMENT MEANS: SEE "CHILTON
AUTOMOBILE DIRECTORY" FOR COMPLETE BUYING INFORMATION ⌚



AJAX

PNEUMATIC TRUCK CORD TIRES

SERVICE and economy in a pneumatic truck tire are dependent upon the enduring qualities built into it. To insure a full measure of endurance, there must be proper balance in materials, construction and design.

Achievement of proper balance in AJAX Cord Tires for motor bus and truck service has been accomplished through long experience and scientific observation of the severest kind of tests.

Motor bus and truck owners are invited to correspond with us on their problems relating to pneumatic cord tires. Make use of this service, without obligation.

AJAX RUBBER COMPANY, Inc.
220 W. 57th Street New York City

NEW FEATURES IN CONSTRUCTION AND DESIGN

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AUTOMOBILE DIRECTORY" FOR COMPLETE BUYING INFORMATION Ⓢ

The Evidence

for Dealers to Consider

The Schacht Ten Speed Truck daily demonstrates to dealers that only performance facts count in the upbuilding of a profitable truck business.

For instance:

Schacht buyers expect to get at least ten years of service from this better-built truck—and they do, as reports from enthusiastic Schacht Dealers clearly show. *That's the kind of record which builds good will, reputation and profits for Schacht Dealers.*

Many Schachts have covered 150,000 to 200,000 miles in continuous service. They have operated on little fuel—have had comparatively little engine and chassis wear and tear—and have easily outworn other makes. *That's because of the remarkable Schacht Ten Speed Transmission which entirely eliminates destructive vibration.*

Practically every original buyer of Schacht Trucks has re-ordered Schachts as his truck needs have increased. *This has confirmed the belief of the observant dealer that Schacht is the profitable line to handle.*

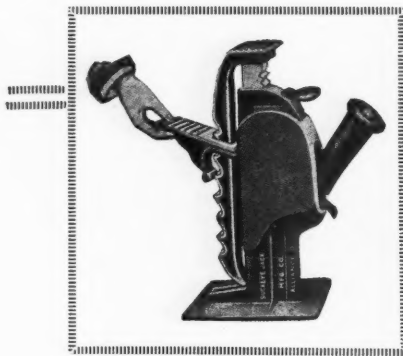
Ally your fortunes with that of one of America's oldest and most successful truck makers—for certain profits and a worth-while future. Get all the evidence on which to base your decision. *Write now.*

1½-2
3-4
5-7
Ton
Capacities

THE G. A. SCHACHT MOTOR TRUCK CO.
8th and Evans Streets Cincinnati, Ohio

Schacht

Ten Speed Trucks

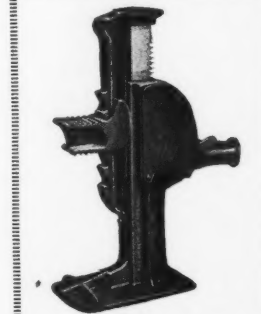


A strong and reliable 5 ton Truck Jack, fitted with quick hand adjustment.

Two and one-half ton Truck Jack



Three, five or seven and one-half ton quick-acting Truck Jack.



3 1/2 ton adjustable Foot Jack. This foot may be used as side lift, as shown, or turned over as an extension top.

The Most Complete Line of Jacks in the World **BUCKEYE**

The *Buckeye* line of jacks is complete. It includes all the most popular types for light or heavy passenger cars or trucks.

For that reason, manufacturers who wish to equip their cars with jacks can find just the model they need—*made by a factory on a production basis which brings costs to a minimum.*

Likewise, dealers and jobbers who want to sell the most profitable line of jacks find that Buckeye fills their needs. For the line includes also many of the best selling jacks today. Patented by us and *made by no other jack manufacturer.*

It will undoubtedly pay you to get our catalog describing our entire line of jacks. It will be sent to you on request.

Write for It

THE BUCKEYE JACK MFG. CO.
ALLIANCE OHIO



Ten ton Telescopic Truck Jack. Jack stands 10 1/2" high and has a continuous lift up to 23 1/2" high and operates on ball bearings. Unusually powerful, convenient and efficient jack. Recommended for trucks with large pneumatic tires.



Ten ton Automatic Lowering Jack for general purpose or automotive uses.



Five ton Automatic Lowering Truck or General Purpose Jack.

An *Accepted Name* in a *Broader Field*

THE NAME EATON, long associated with good axles, now takes on larger significance in the bringing together of The Eaton Axle Company, The Perfection Spring Company and The Torbensen Axle Company under one banner—THE EATON AXLE AND SPRING COMPANY.

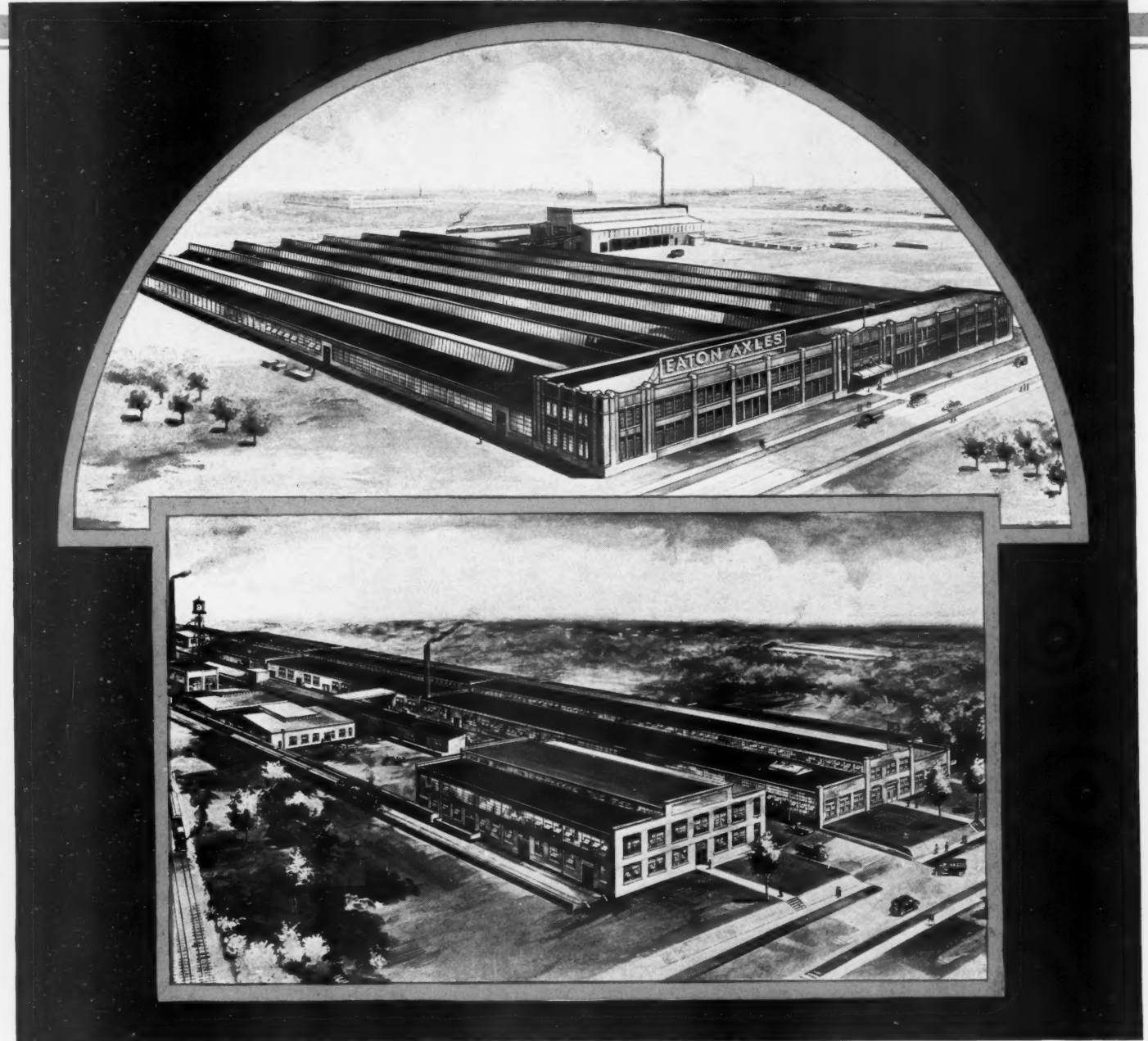
The financial resources and splendid plant equipment of the new company assure a broader service to the automotive industry than has ever been possible before in the production of high grade axles and springs.

EATON

THE EATON AXLE *and* SPRING CO.
Cleveland Ohio.



THE EATON AXLE *and*



Meeting Every Axle Need

WITH the same organizations that have operated them successfully in the past, actuated by the same ideals, these two great plants will continue to specialize in their respective fields. Eaton axles for passenger cars will be built in the plant that is rated the finest of its kind, while in its accus-

tomed home nearby a full line of truck axles, including the famous Torbensen Drive, will be produced.

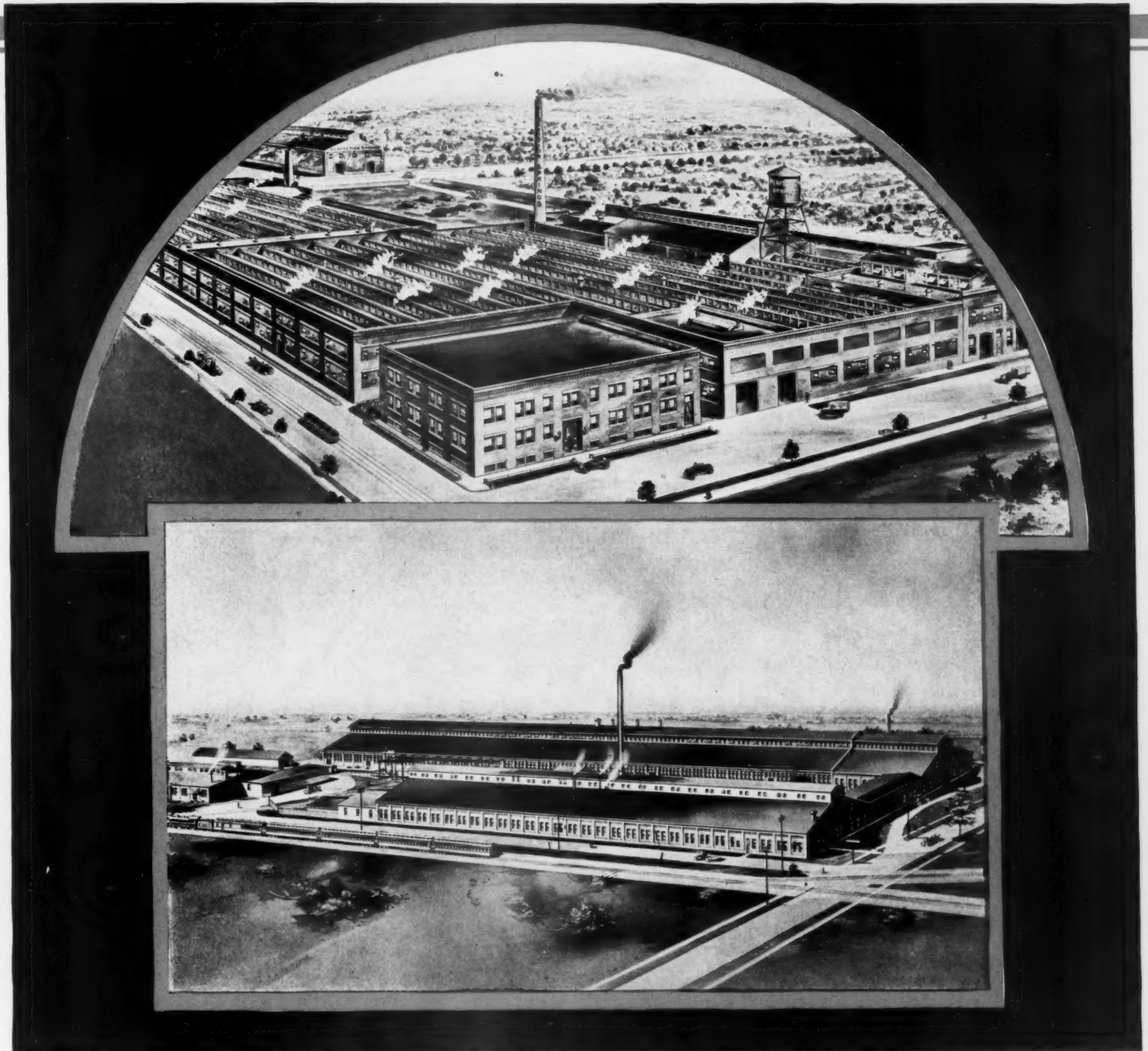
Thru these unusually comprehensive manufacturing facilities we are enabled perfectly to serve the needs of car and truck manufacturers.

EATON AXLES

TORBENSEN
AXLES

PERFECTION
SPRINGS

SPRING COMPANY



The Same Good Springs

THE men who have long built and marketed Perfection Springs continue to operate the spring plants at Cleveland and Pontiac. Identification with EATON enables us to forecast even greater leadership than ever for Perfection



Springs. The figure of the Archer, which has come to be the symbol of Perfection Springs, signifies in the product those qualities of accuracy, resilience and endurance which are indispensable to satisfactory spring service.

EATON AXLES

TORBENSEN
AXLES

PERFECTION
SPRINGS

EATON AXLES
TORBENSEN
AXLES

PERFECTION
S P R I N G S

Our Single Purpose

TO BUILD the best
axles and the best
springs that skilled engineering, careful workmanship, and fine materials can avail.

THE EATON AXLE
and SPRING COMPANY

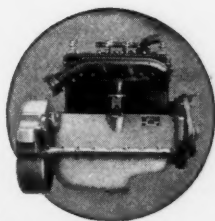


Refrigerator truck operated by The Atlantic City Sea Food Auto Stores Company

Bringing the ocean ashore with Buda

Two to four tons of fish and ice and nearly a ton of water is the regular load of this "fish market on wheels," which was built by the Traylor Engineering & Manufacturing Company, Allentown, Pennsylvania, and equipped with the Buda engine. Running water, electric lights, opalite and zinc lined cleaning tables, refrigerators and show cases are some of the features of this most unusual job.

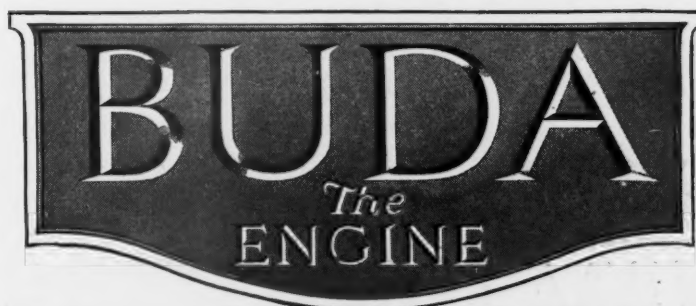
Several of these trucks are now in service and in spite of the tremendous weight, the powerful Buda engine handles them with the greatest ease and at a surprisingly low cost. This is the kind of performance that is responsible for the Buda's enviable reputation; the thing that makes "Buda, the Engine" in the specifications of a truck such a strong selling factor.



BUILT FOR A
PURPOSE

THE BUDA COMPANY, HARVEY CHICAGO ILL.
ESTABLISHED 1881 SUBURB

*Profit by the Buda reputation; sell
trucks that are Buda-equipped*





What Does the Driver Say?

The driver's attitude toward his truck has a great deal to do with the cost and character of delivery service. The upkeep bills show very plainly whether he is "sold" or "sore".

Equip him with a Graham Brothers Truck and he is sold—for good. Owners have found that the driver likes its looks, its easy-riding qualities, its fast get-away in traffic, its rugged power.

And above all, he has a wholesome respect for the same outstanding quality that appeals so strongly to the proprietor himself—the truck's ability to keep going month after month and year after year, with practically no expenses for repairs.

*1 Ton Chassis, \$1265; 1½ Ton, \$1325;
f. o. b. Detroit or Evansville, Ind.*

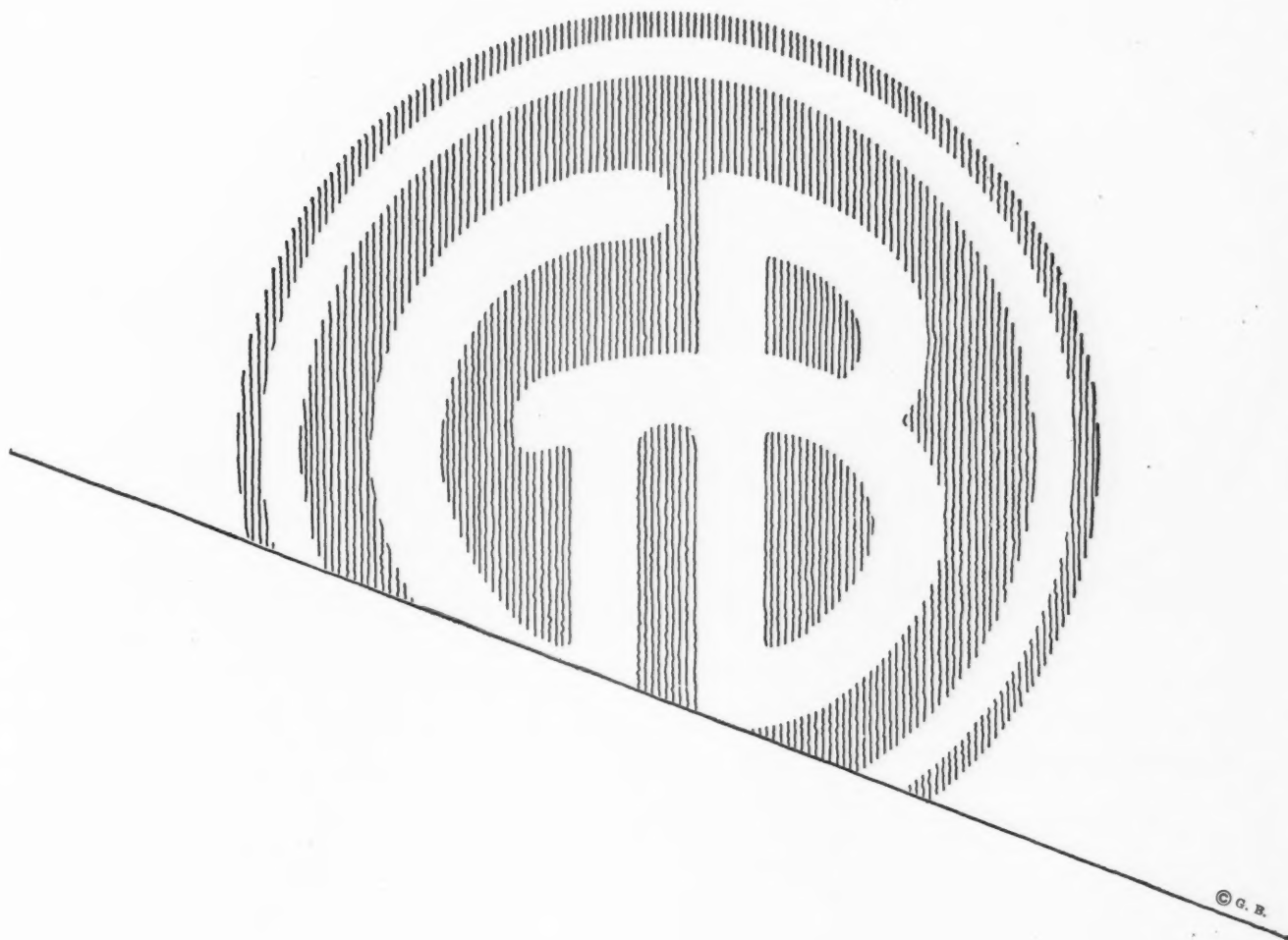
G R A H A M
Detroit

B R O T H E R S
Evansville

GRAHAM BROTHERS TRUCKS

SOLD BY DODGE BROTHERS DEALERS EVERYWHERE

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AUTOMOBILE DIRECTORY" FOR COMPLETE BUYING INFORMATION Ⓢ



Ⓜ THIS SYMBOL IN ANY ADVERTISEMENT MEANS: SEE "CHILTON Ⓜ
AUTOMOBILE DIRECTORY" FOR COMPLETE BUYING INFORMATION Ⓜ



This automobile brake support is an intricate casting of Certified Malleable that must stand the severest shocks and strains of motoring service.

MAKERS OF CERTIFIED MALLEABLE CASTINGS

Certificate Holders for the Quarter Ending December 31st, 1922

Albany Malleable Iron Co.	Voorheesville, N. Y.
Albion Malleable Iron Co.	Albion, Mich.
American Malleable Castings Co.	Marion, O.
American Malleables Co.	Lancaster, N. Y., and Orono, Mich.
Badger Malleable & Mfg. Co.	South Milwaukee, Wis.
Baltimore Malleable Iron & Steel Casting Co.	Baltimore, Md.
Belle City Malleable Iron Co.	Racine, Wis.
Chain Belt Co.	Milwaukee, Wis.
Chicago Malleable Castings Co.	West Pullman, Chicago, Ill.
Columbus Malleable Iron Co., The	Columbus, O.
Danville Malleable Iron Co.	Danville, Ill.
Dayton Malleable Iron Co.	Dayton, O., Ironton, O., and Canton, O.
Deerstar Malleable Iron Co.	Deerstar, Ill.
Devin Mfg. Co., Thomas	Philadelphia, Pa.
Eastern Malleable Iron Co., The	Naugatuck Malleable Iron Works, Naugatuck, Conn.; Bridgeport Malleable Iron Works, Bridgeport, Conn.; Troy Malleable Iron Works, Troy, N. Y.; Wilmington Malleable Iron Works, Wilmington, Del.; Vulcan Iron Works, New Britain, Conn.
Erie Malleable Iron Co.	Erie, Pa.
Federal Malleable Co.	West Allis, Wis.
Flagg & Co., Stanley G.	Philadelphia, Pa.
Fort Pitt Malleable Iron Co.	Pittsburgh, Pa.
Fraser & Jones Co.	Syracuse, N. Y.
General Electric Co.	Erie, Pa.
Illinois Malleable Iron Co.	Chicago, Ill.
Iowa Malleable Iron Co.	Fairfield, Ia.
Kalamazoo Malleable Iron Co.	Kalamazoo, Mich.
Laconia Car Co.	Laconia, N. H.
Lakeside Malleable Castings Co.	Racine, Wis.
Link-Belt Co.	Indianapolis, Ind.
Marion Malleable Iron Works	Marion, Ind.
Malone Malleable Iron Co.	St. Charles, Ill.
National Malleable Castings Co., The	Cleveland, O., Chicago, Ill., Indianapolis, Ind., Toledo, O., E. St. Louis, Ill.
Northern Malleable Iron Co.	St. Paul, Minn.
Northwestern Malleable Iron Co.	Milwaukee, Wis.
Peoria Malleable Castings Co.	Peoria, Ill.
Pittsburgh Malleable Iron Co.	Pittsburgh, Pa.
Rhode Island Malleable Iron Works	Milwaupee, E. I.
Rockford Malleable Iron Works	Rockford, Ill.
Rose-Mechan Foundries, The	Chattanooga, Tenn.
St. Louis Malleable Casting Co.	St. Louis, Mo.
Saginaw Malleable Iron Co.	Saginaw, Mich.
Standard Malleable Castings Co.	Terre Haute, Ind.
Stowell Co., The	South Milwaukee, Wis.
Symington Co., T. H., The	Rochester, N. Y.
Temple Malleable Iron & Steel Co.	Temple, Pa.
Terre Haute Malleable & Mfg. Co.	Terre Haute, Ind.
Trenton Malleable Iron Co., The	Trenton, N. J.
Union Malleable Iron Co., The	E. Molino, Ill.
Vermilion Malleable Iron Co.	Hoopston, Ill.
Wagner Malleable Iron Co.	Hammond, Ind.
Warren Tool & Forge Co.	Warren, Ohio
Webster Mfg. Co., The	Chicago, Ill.
Wisconsin Malleable Iron Co.	Milwaukee, Wis.
York Mfg. Co.	York, Pa.
Zanesville Malleable Co.	Zanesville, O.

Let "Certified" Guard the Quality of the Malleables you Buy

If a book were written today on the Romance of Iron and Steel, a chapter could well be devoted to the remarkable improvement in Malleable iron during the past ten years. The rule-of-thumb methods and the go-it-alone policy that existed prior to that time were replaced by scientific foundry practices and a co-operative manufacturing policy that made it possible for every member of The American Malleable Castings Association to produce uniform malleables of the highest quality and integrity.

Today manufacturers of motor cars, trucks and tractors consider it a mark of distinction to use Certified Malleables for the vital parts of their machines, because they know that "Certified" means:—

1. Standardized foundry and metallurgical practice directed by the Association's consulting engineer:— one of the country's eminent scientists.
2. Consulting Engineer's Laboratory tests of bars submitted from daily heats by member companies.
3. Regular inspection of every member's product, by a staff of traveling inspectors under the engineer's direction.
4. Continuous research and experiment to improve soundness, machining qualities and fine finish.

Every member knows that "Eternal vigilance is the price of quality" and he must have 100% quality before his name can appear as a maker of *Certified* Malleable Castings.

THE AMERICAN MALLEABLE CASTINGS ASSN.
The 1900 Euclid Building Cleveland, Ohio



CERTIFIED MALLEABLE CASTINGS

THIS SYMBOL IN ANY ADVERTISEMENT MEANS: SEE "CHILTON AUTOMOBILE DIRECTORY" FOR COMPLETE BUYING INFORMATION



What the RED EYE Does

Red Eye Spring construction makes springs strong where they used to break.

With Red Eye construction the eye is forged at the same time that the top leaf is heated and rolled—thereby eliminating numerous other consequent heats, required in making ordinary springs, which often change the micro-structure of the steel.

This method leaves the steel, at the union of the eye and leaf, *with its integrity unimpaired*—gives the weakest point of the spring the resiliency, toughness and strength needed to withstand shocks.

You may be paying for a high-grade alloy spring—but are you getting the full strength of alloy steel *at the eye*? Get it by specifying the Red Eye Spring made by us.

The Saving Spring Co.
Ashland, Mass.

A Word to Truck Manufacturers

Red Eye Spring construction is a *Visible Selling Feature*. It means spring insurance to the purchaser of your cars. Use it!

The **SAVING SPRING**

Ⓢ THIS SYMBOL IN ANY ADVERTISEMENT MEANS: SEE "CHILTON
AUTOMOBILE DIRECTORY" FOR COMPLETE BUYING INFORMATION Ⓢ

Month By Month— TRANSPORT Sales Volume Climbs!

Some of the Reasons—

TRANSPORT CONSTRUCTION

Engines with removable cylinder heads—force feed lubrication—dry-gas manifold—unusual cooling facilities—valve tappets with hardened tool inserts—AIR CLEANING EQUIPMENT EXCLUDING ALL DIRT—gear-cut flywheels—standard SAE mounting for starter. Oil-Type Joints, perfectly lubricated—preventing waste, greatly reducing time and work of filling. Silico Manganese Springs, drive shaft brake—radius rods—automatic chassis lubrication—front motor support—a score of outstanding features.

Models and Capacities

Including Electrical Equipment

Model 15, 2000 lbs. maximum
Model 26, 3000 lbs. maximum
Model 36, 4000 lbs. maximum
Model 55, 6000 lbs. maximum
Model 61, 7000 lbs. maximum
Model 75, 10,000 lbs. maximum

Every month—every day—brings to the Transport Truck Company overwhelming evidence of the immediate demand for Transport Trucks, and the still bigger future business that confronts Transport dealers. On the heels of a total of 68 orders in two days comes a single order for 26 Transports from one dealer. And Spring business just beginning!

Orders from all parts of the United States

Transport Sales Volume comes from all sections. In the south as well as north, east and west, dealers are wiring "Rush!"

The standing of the Transport Truck Company in the industry and the reputation Transport Trucks have gained by superior performance are attracting the nation's greatest truck merchants, powerful distributing organizations with facilities for marketing trucks on the largest scale. These concerns realize that Transport is meeting public demand in motor transportation, and gives the dealer the opportunity he is seeking. Perhaps there is a Transport opportunity in your territory. Write us.

TRANSPORT TRUCK COMPANY

Mount Pleasant, Michigan

Transport
Is a
Specialized
Truck



Every
Unit
Nationally
Served

Transport Trucks are Outstanding Successes in Motor Bus Service

Make your Service dependable with **SPLITDORF** Ignition



THE new Splitdorf Model SS Magneto means freedom from ignition troubles. Not only that, but the sparks from this instrument are so intense in heat, so positive in action, so vigorous in strength and so dependable in service that they make an old engine throb with new energy—more power, easier starting, less gas and NO worry.

It is for these reasons that Splitdorf Ignition Specialties are now being used so extensively to replace the original ignition equipment on trucks, buses and tractors where the service demands a self-contained, always dependable ignition.

SPLITDORF ELECTRICAL COMPANY
Newark, N. J.



The Splitdorf Green Jewel Spark Plug—the plug that makes it is furnished with multiple layers of Eutectic Ruby MICA wound insulation around an extra heavy electrode stands up under all conditions and is EVERLASTING.

New Splitdorf Magneto, Model SS-4



SPLITDORF ELECTRICAL CO.
MODEL-SS 4
NO. 2314

Thirty minutes after installation, Splitdorf Forced Piston Rings are guaranteed to give more power, save oil, save gas, stop fouling of spark plugs and smoking of engine.



Interlocking-Joint

Piston rings determine the life of any motor overhaul! Only so long as the rings hold compression and keep out excess oil, does the cost of reconditioning pay returns.

This vital importance of piston rings has created sweeping preference for the Gill—Special—Servus line.

Individually cast of special grey iron that indomitably resists wear; and lathe-turned for quick seating, one of the three types — Gill — Special — Servus,

will safeguard to the utmost the investment in repairs.

Gill Interlocking-Joint, 75c; Special Oil-Wiper, 50c; Servus Step-Cut, 30c — each offers maximum protection in its field, and extreme durability at a substantial saving.



Stocked by leading jobbers everywhere, supported by 36 factory branches. 11,000 sizes and oversizes quickly available. The right rings and the right service for building business.

GILL MANUFACTURING COMPANY

8300 South Chicago Avenue, Chicago

Canadian Factory—415 King St. W. (Brown Engineering Co.), Toronto
Sole Canadian Distributor—Canadian General Electric Company, Limited
Export—American Steel Export Co., Woolworth Building, New York City

Special

Oil-Wiper



Servus

Step-Cut

THIS SYMBOL IN ANY ADVERTISEMENT MEANS: SEE "CHILTON AUTOMOBILE DIRECTORY" FOR COMPLETE BUYING INFORMATION



TRADE MARK
AMERICAN
REGISTERED

FAST SERVICE

The man who wants his car or truck back quickly will be your best customer when you handle "American" Springs. Big "American" stocks, wide distribution and special fast service on unusual springs, enable you to serve him promptly and keep him happy.

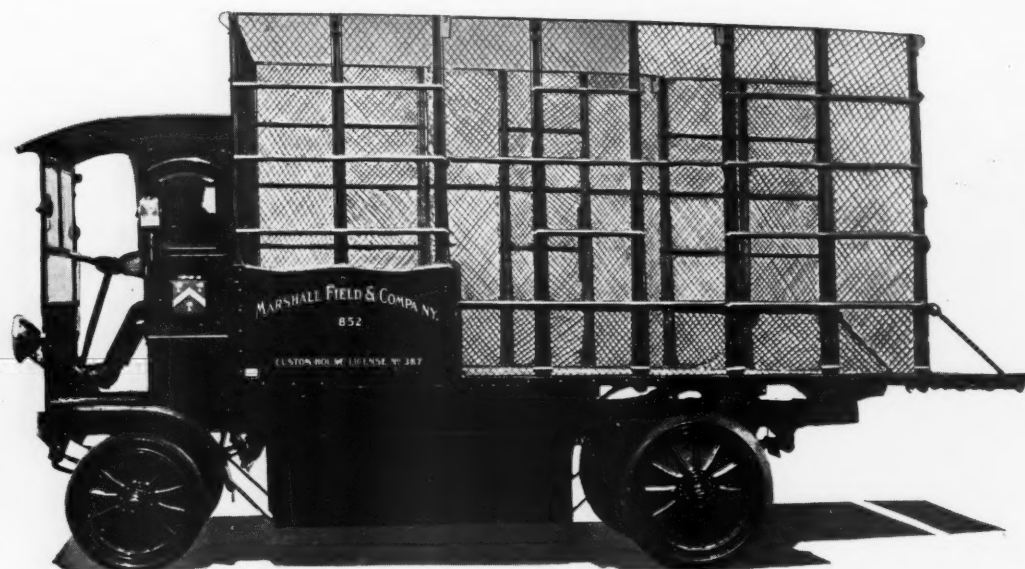
AMERICAN AUTOPARTS COMPANY

9779 French Road Detroit, Mich.

AMERICAN *Springs*

ANY CAR ANY MODEL ANY YEAR

MORAND



Walker Electric Truck, Model E

Reduce Operating Costs

THE protection given by Morand Cushion Wheels is particularly important to the electric truck. The saving resulting from operation on Morand Cushion Wheels is seen in better tire mileage, less current consumption, fewer motor and controller repairs, longer life to battery plates, and absolute protection from road shocks.

There is a Morand Cushion Wheel for any size or make of truck. There is also the Morand Demountable Cushion Element, which replaces giant pneumatics without wheel change.

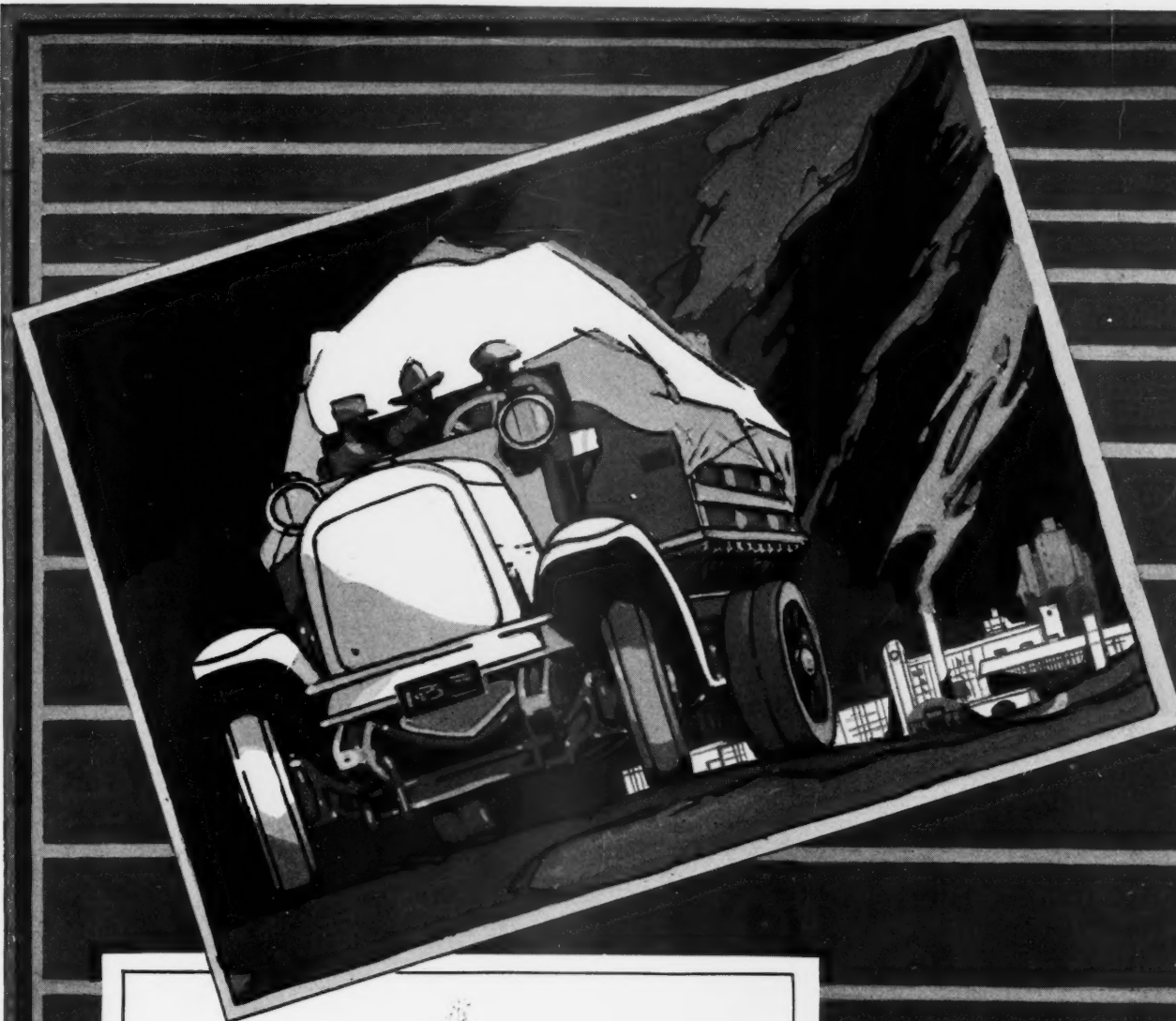
Write Us for Further Information

The Morand Cushion Wheel Co.

800-906 South May Street
Chicago, Ill.

MORAND

CUSHION WHEELS



ECONOMY—EFFICIENCY

The "ship by truck" age is here. The motor truck is an important factor in merchandise transportation.

To keep up with the heavy demands—to haul quickly and economically you must have power that can be depended upon. Power every minute of every hour your truck is on the road.

You get it with Stromberg equipment. There is efficiency and economy—unfailing driving force developed at least cost per mile. Greater tonnage is made possible.

The Stromberg Carburetor is standard equipment of 55% of all listed truck models.

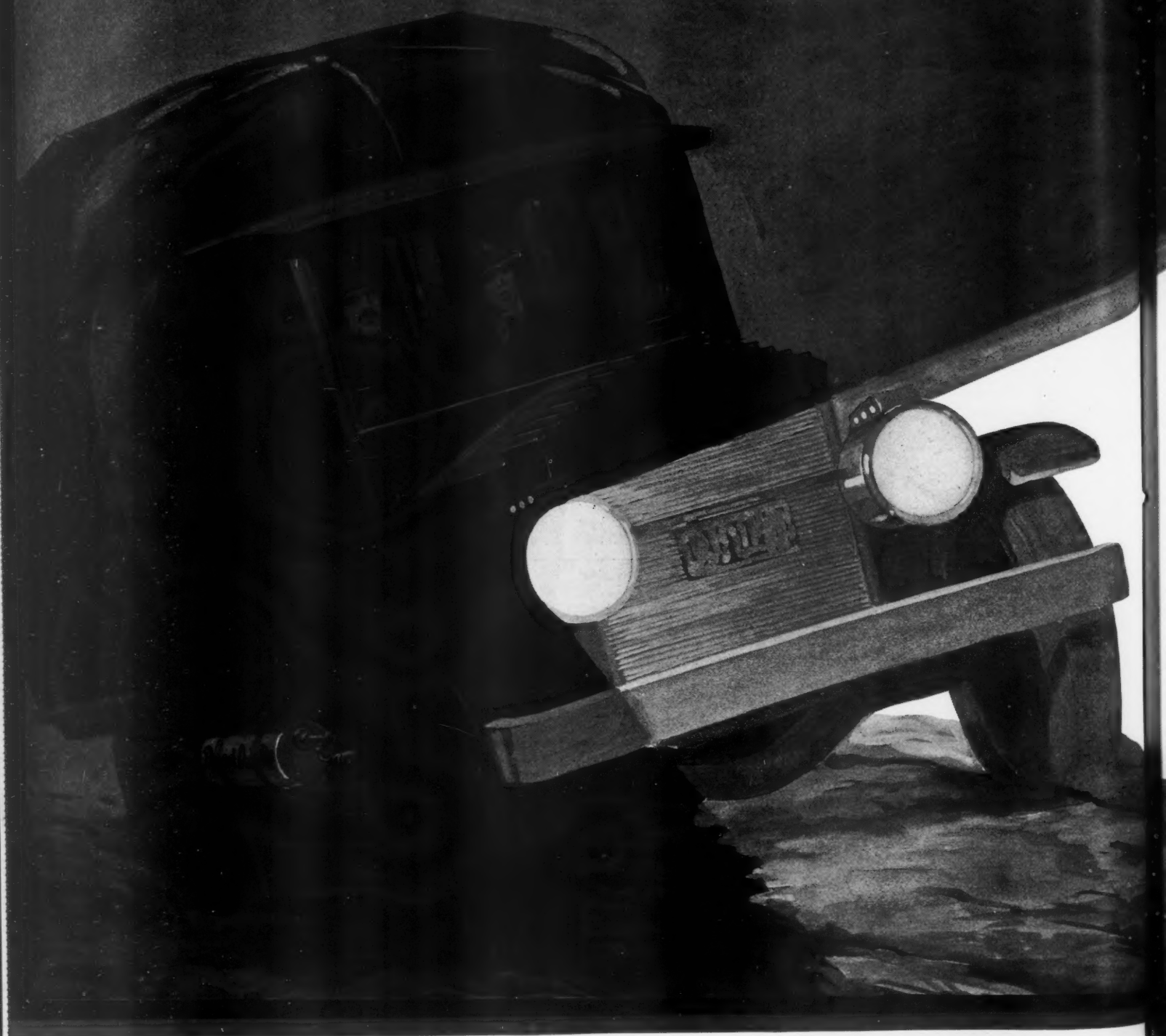
Additional facts upon request—write for them today. State name, year and model of your machine.

STROMBERG MOTOR DEVICES CO.
64 E. 25th St., Chicago, Ill.

Dept. 536

New STROMBERG Does it!
CARBURETOR

Prest-O-Lite



Prest - O -

Gas Never Fails

Over the Roughest Roads

The bangs, jolts and jars of the worst roads never faze your Prest-O-Lite Gas equipment. In the darkest nights, on the roughest highways, they show the driver where he is going and what is ahead of him.

Prest-O-Lite Gas costs less to install and less to maintain. Put it on old or new trucks. Legal everywhere. Known everywhere. Time-tried and road-tested—it is clean, smokeless and dependable.

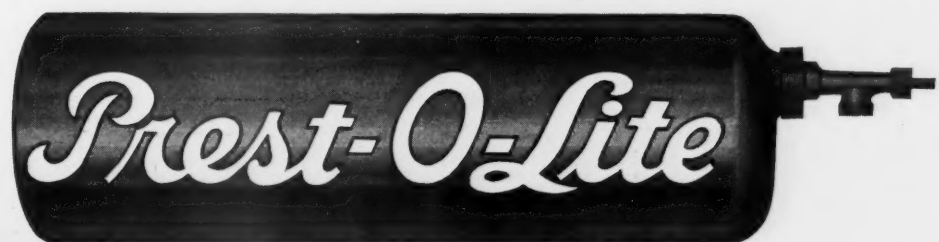
Because it makes good now as it made good in the early days it is the oldest and largest automotive service in America.

THE PREST-O-LITE COMPANY, Inc., Indianapolis, Indiana
Small Tank Sales Department

New York Office: 30 East 42nd Street

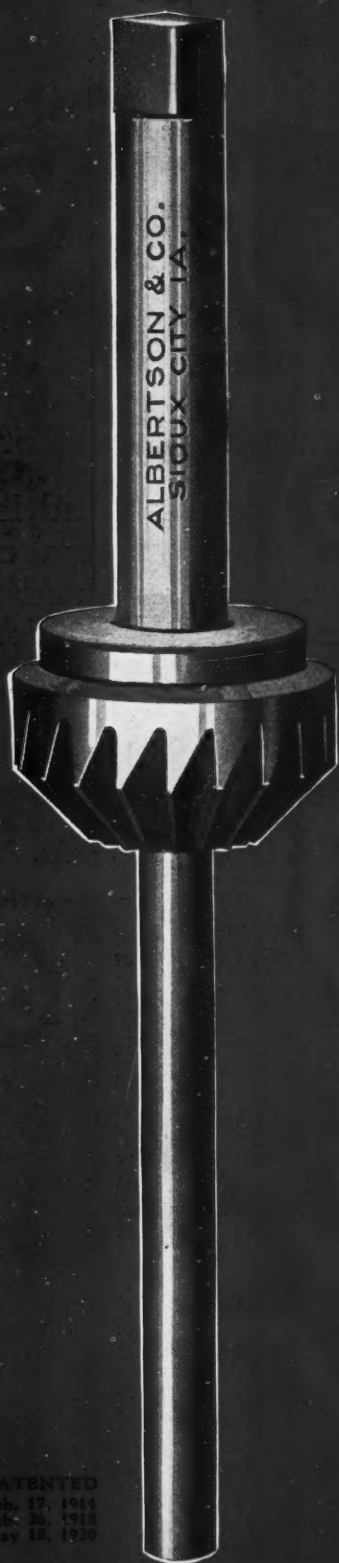
Pacific Coast Office: 599 Eighth Street, San Francisco

In Canada: Prest-O-Lite Company of Canada, Ltd., Toronto



Lite Gas

SIoux VALVE SEAT REAMER



PATENTED
Feb. 17, 1913
Feb. 26, 1918
May 18, 1920

Does Your Shop Toe the Mark?

UNLESS it is equipped with tools that insure efficiency, accuracy and speed you cannot expect it to increase your profits and reduce your overhead.

"Sioux" Tools mean more and better work at smaller cost.

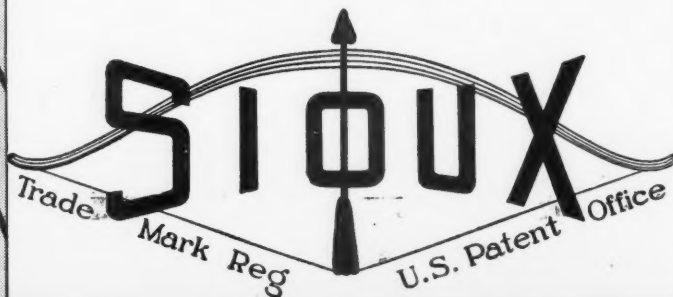
You can save hours of tiresome valve grinding by removing the carbon pits and other irregularities from valve seats with this rapid cutting and absolutely accurate Sioux Reamer. There's a Sioux Valve Seat Reamer for every engine made.

No Chattering of valve seat. By inserting a piece of 50 lb. wrapping paper, large enough to cover valve seat, on the pilot stem between reamer and valve seat you avoid all possibility of chattering. A few turns will cut through paper. Write for free sample.

Your Jobber Sells Them

Write for Catalog and Valve Seat Reamer Specifications
ALBERTSON & CO., SIOUX CITY, IOWA

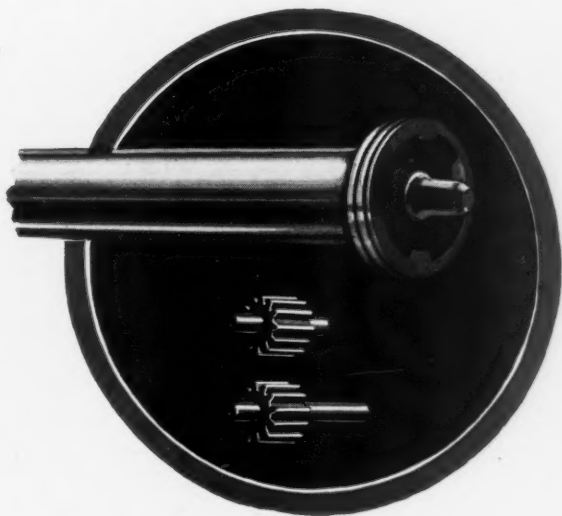
*"The Well Equipped Shop
Gets the Business"*



**Gar Wood Says:**

"Simplicity and dependability are usually found together. In Wood-Detroit Hydraulic Hoists they have made money for truck owners for over a decade."

Gar Wood

**Simple — Efficient**

The vital parts of Wood-Detroit Hydraulic Hoists are two steel gears, accurately cut and meshed, pumping oil to operate a piston in the hoist—3 moving parts, all working in oil.

Dependability

The measure of the value of a hoist is its service; and the service it renders depends on both its efficiency and its dependability.

WOOD

Hydraulic Hoists and Steel Bodies

The simplicity of Wood-Detroit Hoists is one of the big reasons for their dominance. There are no gear trains—no worms, bevels, screws, or other mechanical transmission devices with their inevitable wear, friction and lubrication troubles.

They are, for this reason, dependable—summer or winter—on any kind of work.

Wood Hydraulic Hoist and Body Company

7924 Riopelle Street

Detroit, Michigan



Built by "Gar" Wood

THIS SYMBOL IN ANY ADVERTISEMENT MEANS: SEE "CHILTON AUTOMOBILE DIRECTORY" FOR COMPLETE BUYING INFORMATION

39,000 Miles—
And Still Good!



Here is a tire still good after 39,000 miles of heavy hauling—a tire which has been a wonderfully productive investment for its owners. This tire was on Clinton Avenue Bus, No. 98, owned by Albert Smith, of Newark, New Jersey.

Here is just one of many testimonials of the service delivered by Brunswick's Super-Pneumatic Truck Tires—of the way Brunswicks pay in service and mileage. The exclusive Friction-Proofed process resists roadburn. The big, broad, flat tread assures maximum traction. Investigate Brunswicks for light and heavy truck equipment.

Friction Proofed
BRUNSWICK
TRUCK
TIRES

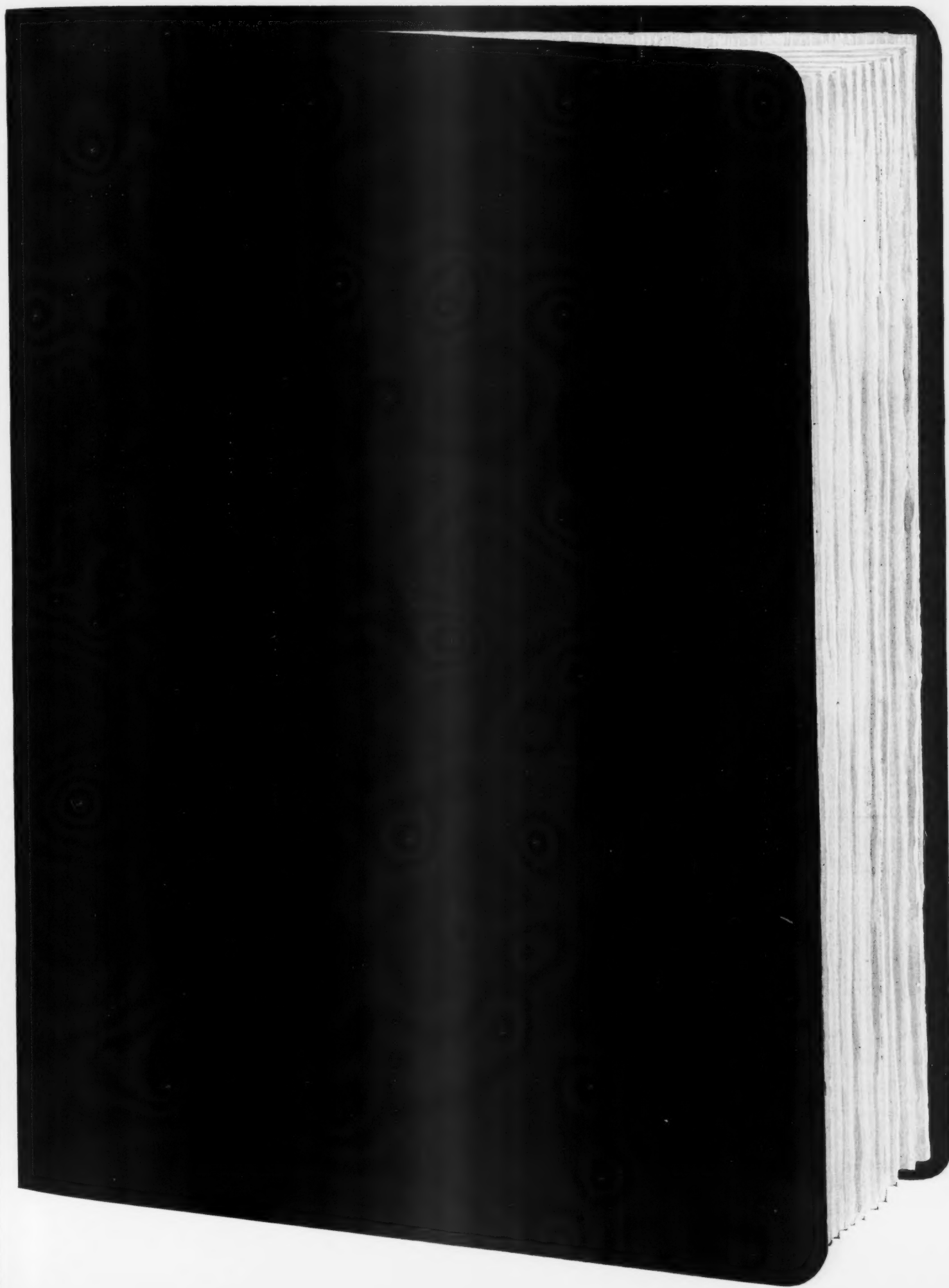
The Brunswick-Balke-Collender Co.

Manufacturers, Established 1845

General Offices: Chicago, Illinois

Branches in all principal cities

Ⓢ THIS SYMBOL IN ANY ADVERTISEMENT MEANS: SEE "CHILTON Ⓢ
AUTOMOBILE DIRECTORY" FOR COMPLETE BUYING INFORMATION Ⓢ



Foreword

THINK OF the opportunity to represent the acknowledged leader in the specialized truck field; to sell the product of a Company with an eleven year record of square treatment accorded its Dealers; to build a substantial business-which is yours for life. That's the kind of an opportunity you have before you as a STANDARD MOTOR TRUCK Dealer.

Standard
Registered
DETROIT
USA

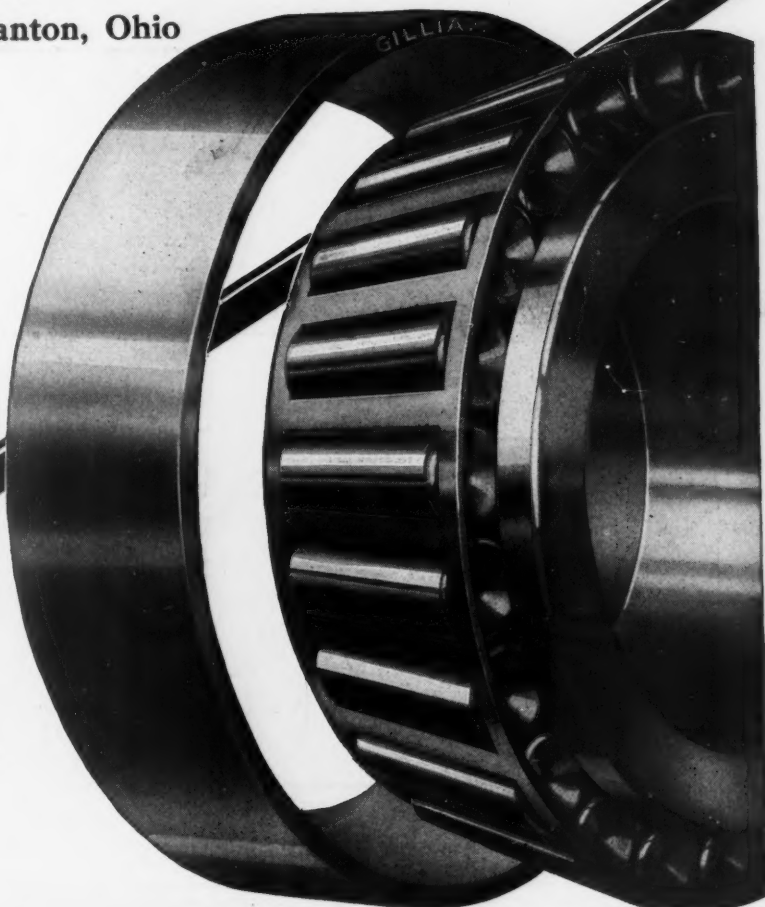
When you see a tapered roller bearing with rollers that are concave at the large end and flush at the other, that bearing you may be certain is a **GILLIAM**.

Axle manufacturers using Gilliam Tapered Roller Bearings include: Adams, Clark, Columbia, Flint, Salisbury, Sheldon, Standard Equipment, Torbensen, U S, Vulcan, Wisconsin.



The Gilliam Mfg. Co., Canton, Ohio

Cups, Cones, Rollers
ALLOY Steel
THROUGHOUT



Ⓢ THIS SYMBOL IN ANY ADVERTISEMENT MEANS: SEE "CHILTON
AUTOMOBILE DIRECTORY" FOR COMPLETE BUYING INFORMATION Ⓢ

Known Values

A motor car can never wholly establish itself as a simple unit of known value. This is an ideal toward which the car approximates, as year after year its name becomes more and more identified with a quality standard.

But since car owners are everywhere and every day discussing cars not as units but as assemblies of component parts, the known—or unknown—values of those parts are and always will be factors in sales. You cannot divorce the value of the part from the value of the whole.

People will always say, "I hear they have a new carburetor, this year," or "How is that 1923 Six working out?"

And whenever a dealer says, "Timken, of course," it is a reassurance of known value that lessens sales resistance.

The entire resources of this company are devoted to maintaining and increasing the known value of the name Timken in the interest of our customers.

THE TIMKEN-DETROIT AXLE COMPANY, DETROIT, MICH.

Sole Representatives in the British Isles:

AUTOMOTIVE PRODUCTS COMPANY, 3, Berners Street, London, W. 1.



Those who are supplying service or product that reduces the cost of automotive transportation have an obligation, to make it known to the motoring public.



Abuse!

No matter how trying the conditions or constant the use, the well known trucks that are equipped with Bower Roller Bearings never have any bearing trouble to report.

There's a reason for this, and the reason lies in the basic Bower Roller Bearing design.

BOWER ROLLER BEARING CO.
Detroit Michigan



BOWER

ROLLER BEARING CO.
Detroit · Michigan

DIXON'S 677

For Transmission and Differential Gears

A Transmission and Rear Axle Lubricant of Dixon quality, that will function long after ordinary lubricants would have failed.

Not only does it last long, but it *lubricates* to the end.

Its superiority over other lubricants is quickly evident to those who use it. They appreciate its economy and the rare type of service it renders.

Try it and be convinced.

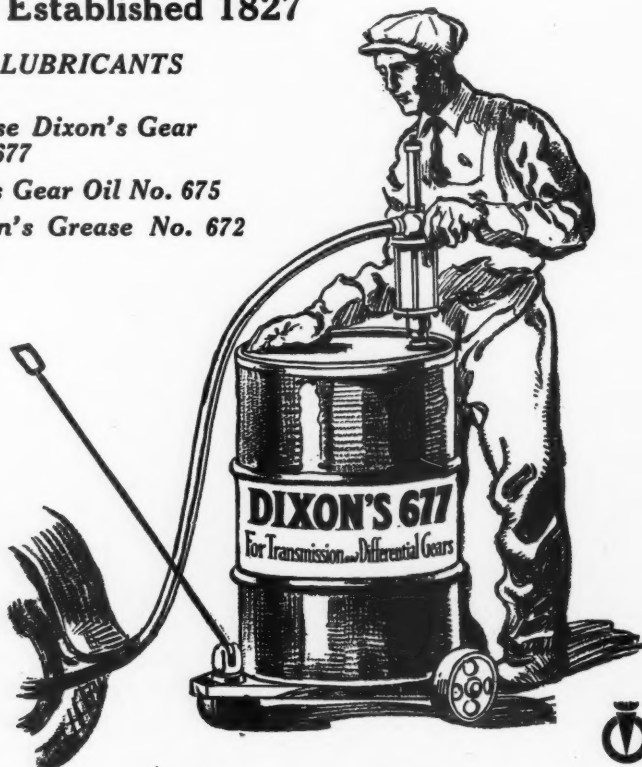
JOSEPH DIXON CRUCIBLE CO.

Jersey City, N. J.  Established 1827

MAKERS OF QUALITY LUBRICANTS

*For Spur and Bevel Gears Use Dixon's Gear
Lubricant No. 677*

*For Worm Drives Use Dixon's Gear Oil No. 675
For Universal Joints Use Dixon's Grease No. 672*



for Light Weight — Use Steel

You recognize quickly that steel wheels have strength.

But do you as quickly accept the assertion that Dayton Steel Wheels are lighter than ordinary wheels?

Yet, such is the case. Dayton Steel Wheels are light because of their unique hollow-spoke and rim construction.

They often weigh 100 lbs. per set less than ordinary wheels.

This saves gas. It saves in tire wear. It increases mileage and power.

[Quality, not price, has induced nearly all leading truck makers to offer Dayton Steel Wheels as standard equipment. Specify them on your next order.]

The DAYTON STEEL FOUNDRY CO.
Main Office and Works Dayton, Ohio

STRENGTH

LIGHT WEIGHT

DURABILITY

TIRE ECONOMY

ACCESSIBILITY

APPEARANCE



Specify

Dayton
Steel Truck Wheels



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AUTOMOBILE DIRECTORY" FOR COMPLETE BUYING INFORMATION Ⓢ



The Star is completely sold on Kelly Kats

After using one set of Caterpillar tires for three months, the Star Van and Storage Co. of Lincoln, Nebraska, writes us as follows:

"We have used one set of Caterpillar Cushion tires for the past three months with absolute satisfaction. We formerly had smooth tread solid tires on this truck but we find Caterpillars are far more resilient than any other tire we have ever used and their traction cannot be surpassed.

"We are operating several other large trucks and the service we have received from this set of tires is sufficient to sell us completely on Caterpillars."

Kelly Kats not only give remarkable traction and exceptional resiliency, but economical mileage as well.

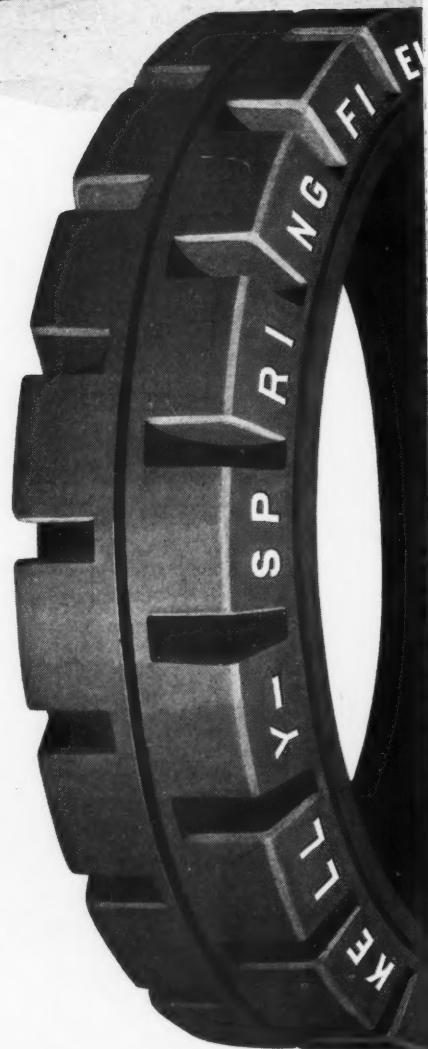
The first two of these qualities invariably sells the truck owner on Kelly Kats and the combination of all of them keeps him sold.

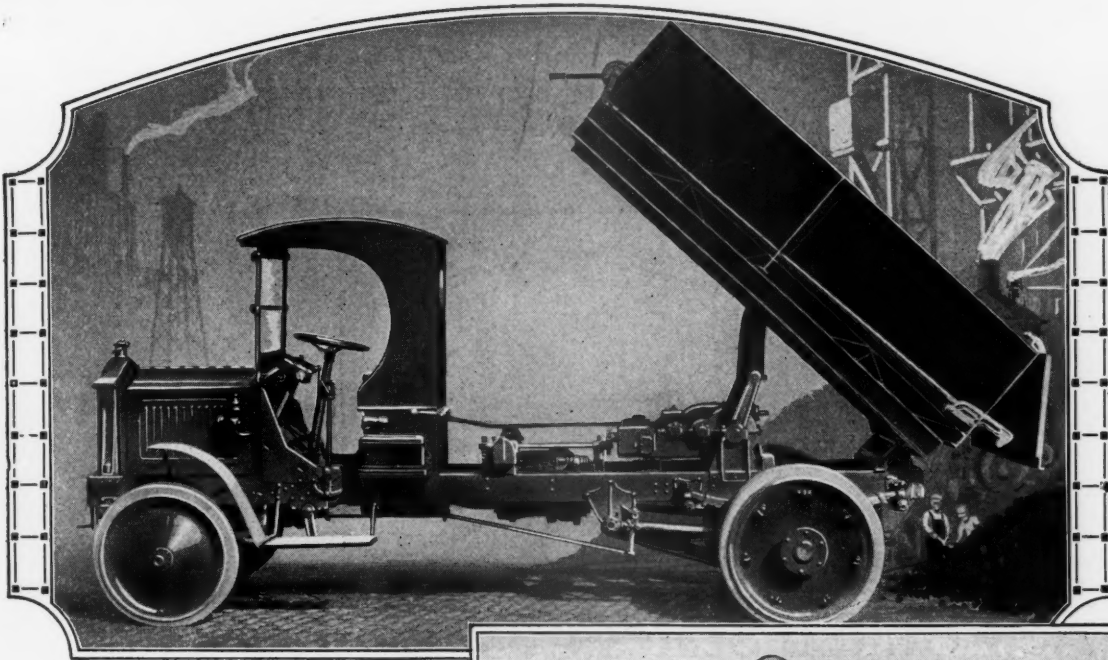
There are no Caterpillar Tires but Kelly Kats

KELLY-SPRINGFIELD
TIRE COMPANY

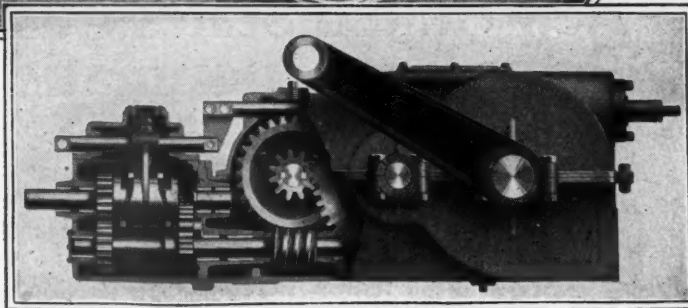


250 WEST 57TH STREET
NEW YORK, N. Y.





Improved Truck Dumping



VAN DORN Vertical and Horizontal Mechanical Dump Truck Hoists mark a real advance in body dumping.

They are positive in control and speedy in operation,—the heaviest load can be dumped in 28 seconds at moderate speed of the motor.

The body can be stopped at, locked, or lowered from any angle up to 45°—the automatic stopping point. The truck can be driving away when the empty body is lowering, the hoist disengaging and stopping automatically when the body settles to its bed.

These mechanical hoists are entirely immune from weather troubles, need no attention save a periodic oiling, and will stand up under the racking test of dump truck service for years.

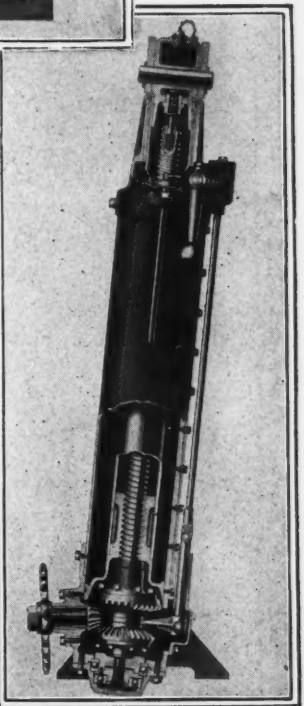
Van Dorn Mechanical Hoists are recommended by all leading dump truck manufacturers. Complete catalog covering all types of Van Dorn Hoists and Truck Bodies sent on request.

THE VAN DORN IRON WORKS COMPANY, CLEVELAND

Dealers! We invite inquiries regarding territories and dealer proposition.

Van Dorn

MECHANICAL DUMP TRUCK HOISTS
BODIES — FRAMES — PRESSED PARTS

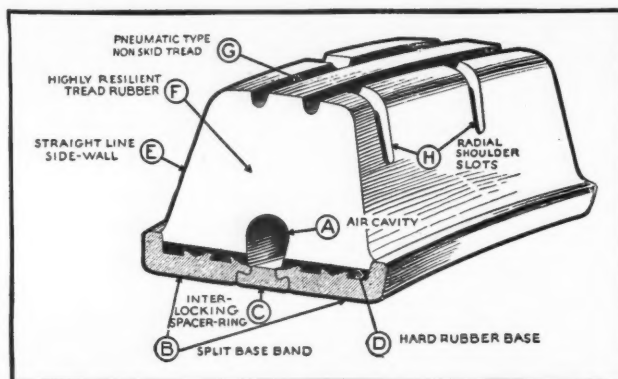


The Cutaway views show the worm and spur gear arrangement in the horizontal hoist and the screw-jack principle and patented automatic lubricating device of the vertical hoist.



Ⓜ THIS SYMBOL IN ANY ADVERTISEMENT MEANS: SEE "CHILTON Ⓜ
AUTOMOBILE DIRECTORY" FOR COMPLETE BUYING INFORMATION Ⓜ

In Response to the Insistent Demand for A Cushion Tire of United States Quality



The New United States Cushion Truck Tire with the New Pneumatic Type Tread



AS YOU see from this sectional view, this new U. S. Cushion Truck Tire is a *marked scientific advance* over the cushion tires on the market heretofore.

With points of the greatest *practical interest* to Truck and Bus Operators.

Give particular attention to the shape of the *air cavity*.

When loaded, the rubber wall bulges partly *inward*. This relieves outside deformation about the base channels. It permits a *greater total deflection*. It gives the U. S. Cushion Tire a *cushioning quality* that is closer to the pneumatic than any other tire of the cushion type.

Because these tires so nearly approach the *pneumatic in action*—that it has been possible to give them a *pneumatic-type non-skid tread*. That insures the maximum traction

and the minimum of slip and skid.

U. S. Cushion Tires have the most satisfactory base yet developed in a cushion tire.

They will not stretch or crush in the press when being applied to a wheel.

They can be fitted as accurately as a one-piece base solid tire.

They have a *straight line contour*, giving maximum width and height and superior cushioning.

The United States Truck Tire line provides a tire for every possible class of service. The United States Truck Tire Service dealer, working with the data compiled by the Technical Service Department of the United States Tire Company, is equipped to advise with you intelligently about your truck tire equipment. Tell him your problems.

United States Cushion Tires are Good Tires



Trade Mark

© 1923, United States Rubber Company, New York.

The Need for Dependable Transportation

*Opens a Remarkable Business Opportunity
Are You Giving It Sufficient Thought?*

How closely have you watched the advance of modern industrial conditions? Have you recognized these facts:

- that prosperity has returned for a lengthy stay?
- that the most conservative of financial writers do not hesitate to say so?
- that bankers say now is the time to engage in active campaigns?
- that the movement is in full swing and gathering momentum?
- that the factories are pouring their commodities into cars day and night?
- that a number of railroads are running trains as close together as possible and making use of every piece of equipment available?

This Is a Good Time to Decide

Have you taken steps to get your share of the profits?

Do you know that motor transportation has a big opportunity all its own, plus a large volume the railroads cannot handle properly?

Garford, a pioneer in Motor Transportation has organized its business to engineer transportation to the users requirements. With the Garford Sales Franchise you can have back of you this engineering service, plus the Garford reputation, plus a wide selection of models and

equipment that enables you to meet the majority of transportation needs.

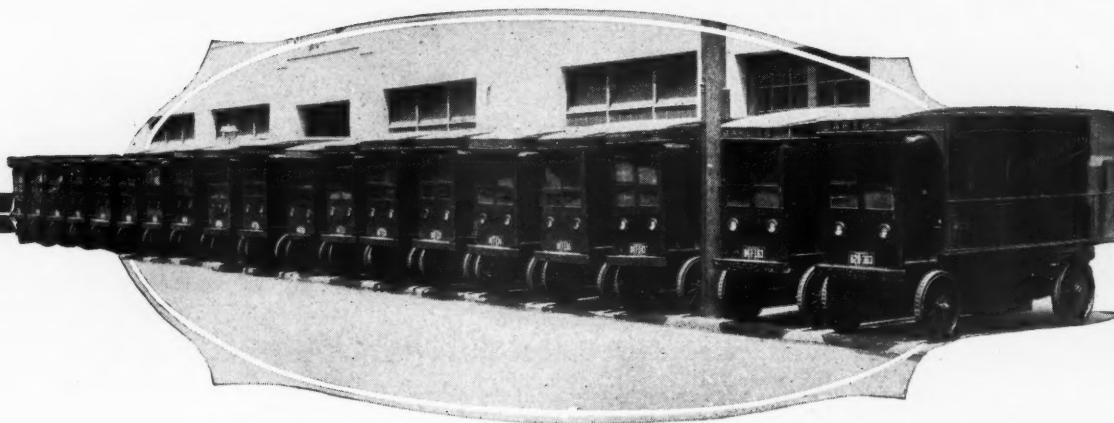
Add to these the Garford prices—the well known sales policy—the co-operation of a highly organized sales force and complete and thorough co-operation in sales promotion and advertising and you can see what the Garford Franchise means. Any Garford Dealer or Distributor will tell you an enthusiastic story. We invite your inquiry regarding open territory if you want to build a substantial, profitable business NOW.

The Garford Motor Truck Company, Lima, Ohio

Makers of Motor Trucks and Motor Busses

GARFORD

DEPENDABLE TRANSPORTATION



If Cushman's Sons, Inc., New York City would place all their Walkers in a Straight line, it would make one fleet almost nine times as long as this one. "Lowest known delivery costs" sold every one of these fine Walkers.

Repeat Orders and the Dealer

Trucking costs are not today the unknown quantities they were twenty years ago. Service is measured. Costs are systematized. Horses and gas trucks cannot compare with the proved economy of the Walker Electric Trucks—25 per cent to 50 per cent lower in operating cost on 85 per cent of city routes.

The demand for more economical trucking is established. A well known company operating trucks in many cities, now using over \$2,000,000 worth of Walkers, recently turned over their 72nd repeat order. Walker economy and performance sold this user as it will thousands of others.

High grade, responsible dealers in preferred territories can profit on this demand by securing Walker dealerships. Our national advertising campaign helps the dealer sell. We support him with intensive co-operation. Profits are bigger. Repeat orders are the most valuable asset of any truck dealer. 80 per cent of our orders are repeat orders. Write us for information.

WALKER VEHICLE COMPANY : Chicago
AMERICA'S LEADING MANUFACTURER OF ELECTRIC ROAD TRUCKS

New York Boston Philadelphia Buffalo
Newark Atlanta New Orleans

Load Capacities: $\frac{1}{2}$ —1—2—3 $\frac{1}{2}$ —5 tons

WALKER ELECTRIC TRUCKS

LOWEST TRUCKING COST

Ⓢ THIS SYMBOL IN ANY ADVERTISEMENT MEANS: SEE "CHILTON
AUTOMOBILE DIRECTORY" FOR COMPLETE BUYING INFORMATION Ⓢ



Seven Reasons—Why

the use of genuine Keratol will mean

profit to you

REASON No. 3

No Waste in Cutting Standard width rolls do away with the waste inevitable with uneven hides—saving material, time and expense.

Cutting Genuine Keratol for the job is a matter of mathematical exactness—not guess work.

7

KERATOL FEATURES

Low Initial Cost
Resistance to Wear,
Knocks and Scuffing
No Waste in Cutting
Works Up Easily
Finish
Unharmed by Gas, Oil
or Grease
Guaranteed

The Logical Material—The Ultimate Material

The Keratol Company

Newark, N. J.

GENUINE KERATOL GUARANTEED

REGISTERED TRADE-MARK

Ⓢ THIS SYMBOL IN ANY ADVERTISEMENT MEANS: SEE "CHILTON Ⓢ AUTOMOBILE DIRECTORY" FOR COMPLETE BUYING INFORMATION Ⓢ



AMERICAN LA FRANCE

Commercial Trucks

Backed by 78 Years' Successful Experience

To have produced fire apparatus since 1845 is more than an interesting bit of history to the commercial truck user.

To have retained leadership of the fire fighting field over this long period of time denotes a quality product.

During the last 15 years American-LaFrance MOTOR DRIVEN Fire Apparatus has made good in the 90% of American fire departments where it is used.

This is a strong recommendation for the American-LaFrance Commercial Truck. It signifies modern designing, sound manufacturing principles with strong executive and financial backing.

**Remember the name American-LaFrance
It means more than just a motor truck.**

Built Only By

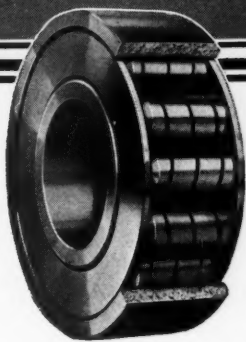
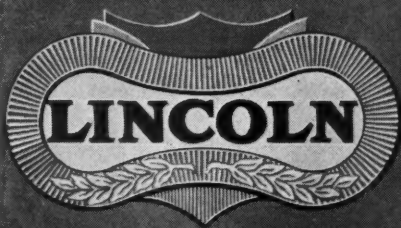
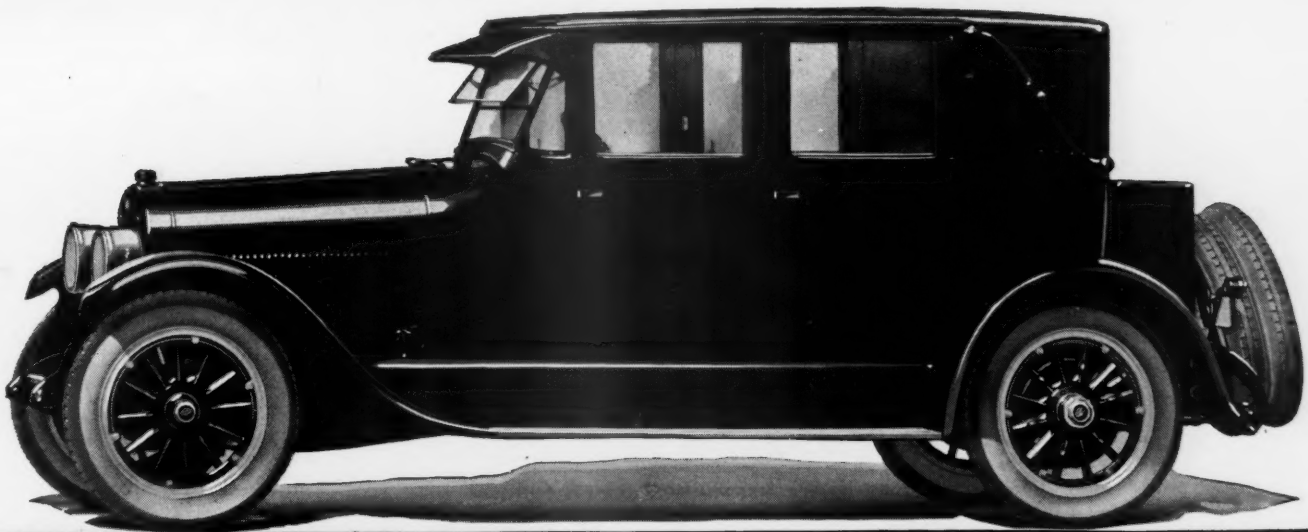
AMERICAN-LA FRANCE FIRE ENGINE COMPANY, INC.

COMMERCIAL TRUCK FACTORY
BLOOMFIELD, N. J.

NEW YORK OFFICE
FISK BLDG., BROADWAY AT 57TH ST.
FIRE APPARATUS FACTORY, ELMIRA, N. Y.



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AUTOMOBILE DIRECTORY" FOR COMPLETE BUYING INFORMATION ⌘



HYATT

Quiet
Roller Bearings

The high reputation enjoyed by the Lincoln is due largely to the exacting standards of materials and workmanship that characterize every step in the manufacture of this high-grade car.

Where such high standards of construction are demanded it is obvious that Hyatt roller bearings should be specified for important locations.

Hyatt roller bearings are used in the transmission and on the propeller shaft of the Lincoln. In the transmission they assure a simplified, noiseless unit that will give enduring satisfaction. On the propeller shaft Hyatt bearings help to steady this member and enhance riding qualities by relieving the rear springs of torque loads due to driving and braking.

HYATT ROLLER BEARING COMPANY

Newark Detroit Chicago San Francisco

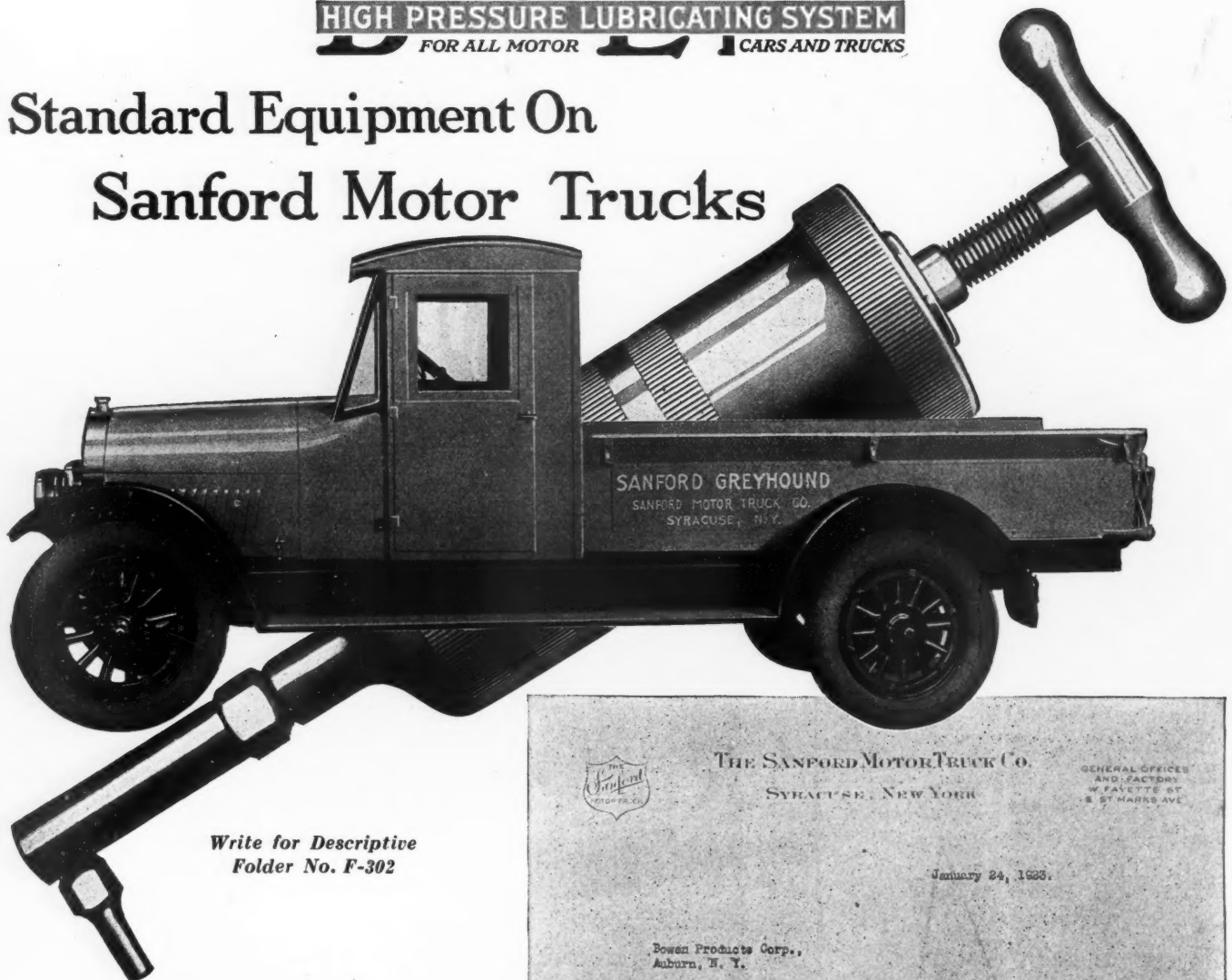
Worcester Milwaukee Huntington, W. Va. Minneapolis Philadelphia
Cleveland Pittsburgh Buffalo Indianapolis

Rowen-Empress

HIGH PRESSURE LUBRICATING SYSTEM

FOR ALL MOTOR CARS AND TRUCKS

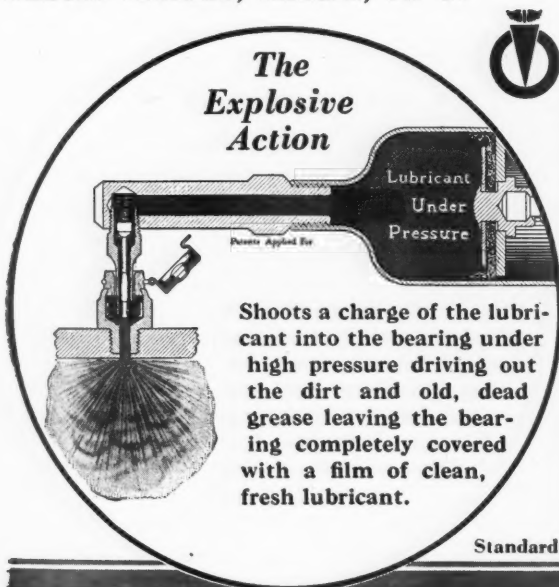
Standard Equipment On Sanford Motor Trucks



Write for Descriptive
Folder No. F-302

**Bowen Products
Corporation**

Auburn Division, Auburn, N. Y.



THE SANFORD MOTOR TRUCK CO.
SYRACUSE, NEW YORK

GENERAL OFFICES
AND FACTORY
16 FALETTE ST.
& ST MARKS AVE.

January 24, 1923.

Bowen Products Corp.,
Auburn, N. Y.

Gentlemen:-

We are well satisfied with the Bowen-Empress Lubricating System as used on our new speed model and want you to know it.

After exhaustive competitive tests, we adopted the Bowen-Empress System as standard equipment and our experience with it since has demonstrated the soundness of our judgment.

Primarily we were impressed with the explosive action feature and the ability to operate it with one hand; thorough tests proved both to be practical and effective, and also demonstrated that both the gun and connections are sturdily constructed and fool-proof. Then too, its adaptability to use with either oil or grease together with the elimination of flexible tubes and the necessity of locking the gun to the connections are great improvements over other systems.

We are convinced that the ease and simplicity of operation of your system provides the truck driver with an incentive to keep his truck properly lubricated and helps to maintain Sanford Trucks reputation for low cost of upkeep.

Yours very truly,
SANFORD MOTOR TRUCK COMPANY

W. Sanford
Sales Department.

DS:LB

Standard equipment on more than fifty other automobiles and motor trucks.

THIS SYMBOL IN ANY ADVERTISEMENT MEANS: SEE "CHILTON
AUTOMOBILE DIRECTORY" FOR COMPLETE BUYING INFORMATION

Be Fair to Yourself!

St. Paul Agencies and Service Stations

BALTIMORE, MD., Kunkel Service Co., Light and Lee Sts.
 BILLINGS, MONT., F. B. Connelly Machinery Co.
 BIRMINGHAM, ALA., Birmingham Motor Co.
 BUFFALO, N. Y., Truck Equipment Co., 1016 Lafayette Ave.
 CAMBRIDGE, MASS., Springfield Com'l Body Co., 80 Charles River Road.
 CHICAGO, ILL., Jacob Press' Sons, 501 W. 33d St.
 CINCINNATI, OHIO, Kelly, Roth & Co., 509 Depot St.
 CLEVELAND, OHIO, American Coach & Body Co., 3809 Clark Ave.
 DAYENPORT, IOWA, Hydraulic Hoist Co., 417 W. 3d St.
 DETROIT, MICH., Hydraulic Hoist Mfg. Co., 5730 Michigan Ave.
 KANSAS CITY, MO., National Steel Products Co., 1611 Crystal Ave.
 KANSAS CITY, MO., Standard Steel Works, 16th and Holmes Ave.
 LOS ANGELES, CAL., Arthur L. Eaton, 3769 Moneta Ave.
 MINNEAPOLIS, MINN., Hydraulic Hoist Co., Hennepin and 10th Ave., S. E.
 NEWARK, N. Y., Arcadia Trailer Corporation
 NEW YORK CITY, N. Y., Interboro Hoist & Body Corp., Borden Ave. and Van Dam St., Long Island City.
 OKLAHOMA CITY, OKLA., American Tank Co.
 PHILADELPHIA, PA., Rodenhau-sen's Excelsior Wagon Works, 1437 N. Hutchinson St.
 PITTSBURGH, PA., Hydraulic Hoist and Body Co., Braddock Ave. and Kensington St.
 PORTLAND, ORE., Fred Dundee, E. Water and Salmon Sts.
 ST. LOUIS, MO., Rogers Schmitt Wire & Iron Co., 1815 N. 23d St.
 SAN FRANCISCO, CAL., Arthur L. Eaton, 40 McDougal Court
 SEATTLE, WASH., Earl B. Staley Co., 1002 E. Seneca St.
 SPOKANE, WASH., March-Strickle Motor Co.
 SPRINGFIELD, MASS., Springfield Com'l Body Co., 385 Liberty St.
 WASHINGTON, D. C., Witt Will Co., Inc., 52 N St., Northeast

Make your selling efforts count double.

When you offer your chassis to a building contractor, coal company, road contractor, or other user of dumping equipment, also sell a St. Paul Hydraulic Hoist and a Superior Steel Body.

In that way you'll make three profits instead of one, and thoroughly satisfy your customer—because the powerful, trouble-proof St. Paul Hoist is especially designed to fit *your* chassis.

This husky one-man-operated hoist can dump $\frac{3}{4}$ ton to 15 ton loads in 30 seconds—and is made to withstand the severest dumping service.

As a St. Paul dealer you can give customers a complete range of these vertical and underbody original hydraulic hoists, including a new underbody model for trucks of $\frac{3}{4}$ ton to $1\frac{1}{2}$ ton capacity.

Be fair to yourself. Make your truck-selling efforts count double with a St. Paul franchise. Now is the time to secure it—for additional substantial profits. *Write.*

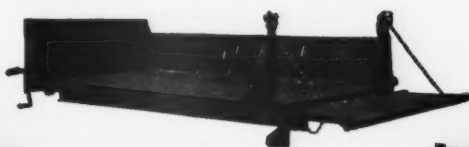
Hydraulic Hoist Mfg. Company

292 Walnut Street, St. Paul, Minn.



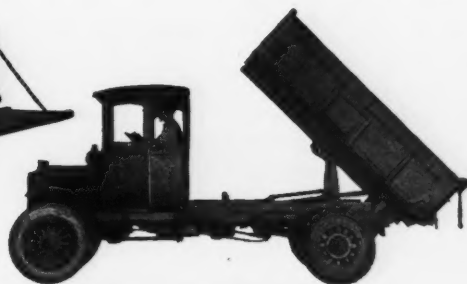
Vertical Hoist

5" for trucks rated capacity of 3 tons or less.....\$320.00
 6" for trucks rated capacity of $3\frac{1}{2}$ tons or more... 350.00



Superior Steel Body

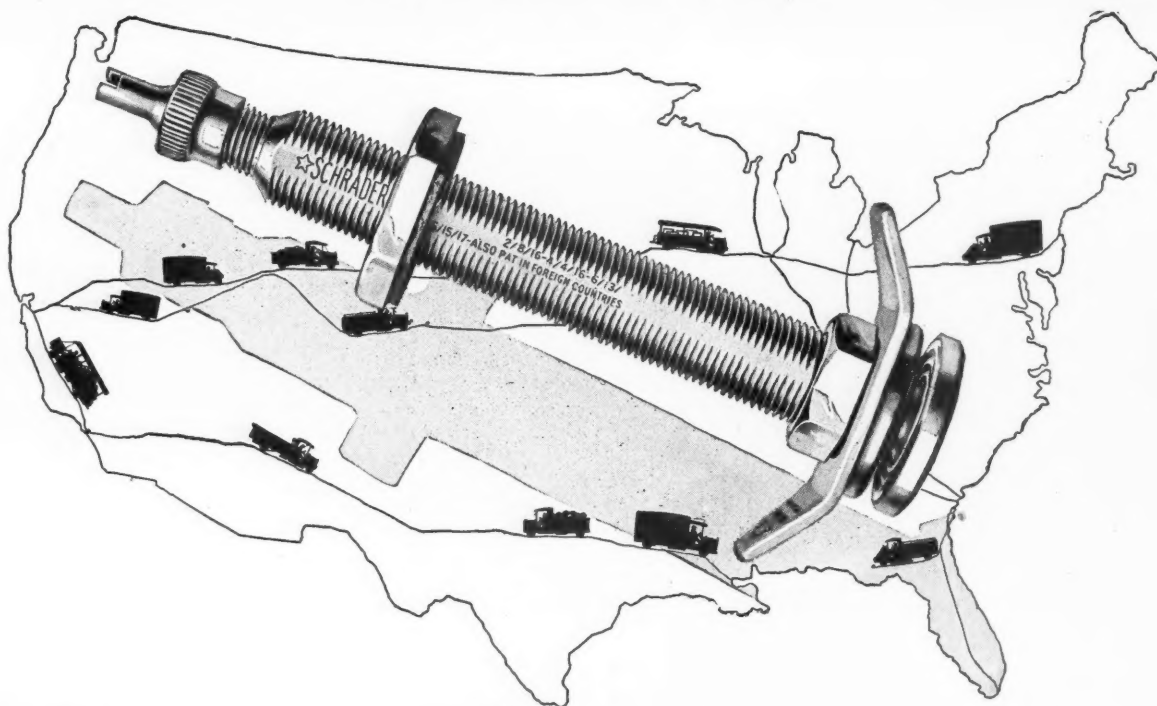
Made of 8 gauge steel in 7 models. Double-acting tail gate, standard equipment.



Underbody Hoist

5" for trucks rated capacity of $\frac{3}{4}$ to $1\frac{1}{2}$ tons.....\$220.00
 6" for trucks rated capacity of 3 tons or less..... 340.00
 8" for trucks rated capacity of $3\frac{1}{2}$ tons or more... 375.00

ORIGINAL HYDRAULIC ST. PAUL HOISTS



What tire valves mean to truck transportation

THROUGH city streets, along country roads, to and fro across the continent, with food and clothing, necessities and luxuries of life, rushes the motor truck on pneumatic tires. And over the whole scene hovers the shadow of a tire valve.

The tire valves on your pneumatic truck tires have a responsibility as great as that of any vital part of your engine. Your tires depend on their valves. If the tire valves do not keep in air, under-inflation will soon take many miles out of the life of your tires and add to your tire costs.

Schrader Tire Valves hold air

Schrader Universal Tire Valves have been proving their ability to retain air ever since trucks began to be equipped with pneumatic tires. They work simply, *automatically*. Through them you can inflate easily and quickly without manipulation of the valve parts.

Schrader Tire Valves give long and effective service when used complete with Schrader Valve parts. These valves embody the most up-to-date principles of tire-valve construction, and with them you may be sure of getting from your truck tires the full mileage they are expected to give.

Use this Schrader Tire Valve complete with dust cap, valve cap, and rim nut to get the greatest efficiency from it. All parts are interchangeable and are available all over the world, wherever motor accessories are sold.

If your men must replace a valve inside, tell them always to insert another Schrader High Pressure Valve Inside made specially for giant pneumatics. Also have your inspectors be sure that a Schrader Rim Nut, a Schrader Valve Cap and a Dust Cap are on every valve.

Get these parts from your supply house.

A. SCHRADER'S SON, Inc., Brooklyn, N. Y.

Chicago

Toronto

London

Manufacturers of Schrader Valve Insides, Valve Caps, and Tire Pressure Gauges

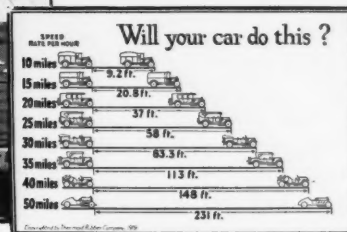
SCHRADER

TIRE VALVES

THIS SYMBOL IN ANY ADVERTISEMENT MEANS: SEE "CHILTON
AUTOMOBILE DIRECTORY" FOR COMPLETE BUYING INFORMATION



Famous Thermoid Standard Chart—shows distances in which car should stop if brakes are efficient. Brakes lined with Thermoid meet these standards.



"This lining is compressed in the factory, instead of on your car"

The striking economy that is selling Thermoid Brake Lining for thousands of dealers

He had just had his brakes relined. He was examining two strips of lining on the counter. "Why," he asked, "does this one feel so much heavier than that one?"

"The heavier one's Thermoid," answered the garage owner. "It's got 40% more material in it. They compress it in their factories instead of on *your* car—with *you* paying for the frequent adjustments!

"Thermoid wears down instead of mashing down. You get longer wear, and you get constant gripping power till your lining is worn wafer-thin. Your brakes are always there when you want them!

"You've got safety *plus* economy!"



Left: cross-section of ordinary brake lining. Right: cross-section of Thermoid Hydraulic Compressed Brake Lining. Dots show actual thickness of Thermoid's 40% extra material before compression.

Thermoid doesn't "squeeze out"

Look at the edge of an ordinary brake lining, "squeezed out" on the drum. Two thousand pounds of hydraulic pressure have taken the "squeeze" out of Thermoid—and enabled us to put 40% more material in its place!

That is why Thermoid is the last to show the "ragged edge" between drum and brake band. Watch for this evidence of Thermoid's wearing quality, yourself.

Thermoid is also *grapnelized*—a special process which prevents it from grabbing, slipping or absorbing moisture.

The national advertising is telling the Thermoid story to millions of motorists throughout the country this year. Write for prices and full information about sales helps furnished to all Thermoid dealers.

THERMOID RUBBER COMPANY

Factory and Main Offices, Trenton, N. J.

New York
Cleveland
Boston

Chicago
Kansas City
London

Los Angeles
Seattle
Paris

Detroit
Atlanta
Turin

Thermoid Brake Lining

Hydraulic Compressed

Makers of "Thermoid-Hardy Universal Joints"
and "Thermoid Crolide Compound Tires"



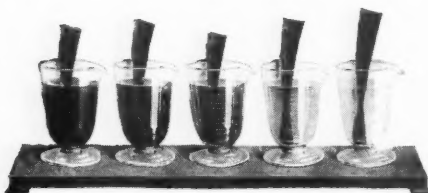
“You can get a Ford transmission lining today that won’t foul your oil like that”

The motorist was having his oil changed. The head floorman dipped his finger in its thick blackness, examined it closely. “Carbon’s bad enough,” he said, “but a lot of this dirt comes from your transmission lining.”

For years Ford owners have had to use treated linings that dissolve their harmful compounds in the oil.

Rexoid, the new Ford transmission lining, is *insoluble in oil*. It is bringing increased business to thousands of dealers and garage men.

“48 hours in oil”—an amazing test of transmission linings



After 48 hours in oil, four makes of lining A, B, C, and D, had discolored the oil, giving off tar and other harmful ingredients. The only lining that did not foul up the oil was E—Rexoid.

Five different linings were left to soak in the same grade of oil—the grade used for transmission and cylinders on Ford cars.

In six hours, the oil in four of the beakers was fouled. After 48 hours of steady soaking, the oil containing the Rexoid Lining was still absolutely clear.

This new Rexoid compound is pressed—practically vulcanized—into every fibre of a high-grade woven fabric. Compound and fabric become one solid mass. There is uniform, high co-efficient of friction until the lining is worn thin as cardboard.

Its hydraulic compression gives Rexoid

1. More material to the square inch
2. A smoother surface and a longer life

Above all: Rexoid does not foul up the oil that goes into the power plant.

Leading jobbers carry Rexoid. If your jobber cannot supply you, write us direct, giving his name.

THERMOID RUBBER COMPANY

Factory and Main Offices, Trenton, N. J.

New York	Chicago	Los Angeles	Detroit
Cleveland	Kansas City	Seattle	Atlanta
Boston	London	Paris	Turin

REXOID

Transmission lining for Ford Cars





THE SPRING IS THE THING

Mather Springs
Scientifically
Heat Treated

The
Mather Spring Co.
Toledo~Ohio.

MATHER
SPRINGS

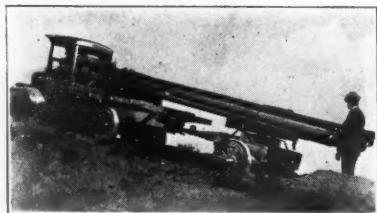


A part of the Consumers Company's fleet of 21 Warner Converted trucks—now hauling profitable loads

Progress Towards Perfection



Showing four wheel trailer type for heavy, bulky loads



Showing two-wheel heavy duty pole trailer, used extensively in the oil fields where road conditions are bad.

The exacting demands upon the present day truck hauling and transportation problems has caused truck owners and operators to look forward to the coming of a better trailer—a trailer that fulfilled to the utmost their needs and requirements. To meet these requirements, a trailer entirely new and different in design was necessary.

The Warner Trailers are designed trailers—not an invention. They have been designed and built by the best truck trailer engineers in the land, who have combined in the Warner Trailer every feature necessary to make it 100% efficient.

Proof of this is in the fact that hundreds of truck owners and operators have backed their belief, that the Warner Trailers are the best money can buy, with cold cash. These hundreds of owners and operators knew that a Warner Trailer would help to accomplish three things—speed up deliveries—increase volume tonnage—and lower costs—all vital factors in the hauling problems of today.

Contractors and road builders, coal dealers and oil operators—the largest users of trailers—all use Warner Trailers.

Let our engineers, who are experts on hauling problems, give you specific data and figures on your hauling costs. Write today, the advice is free.

A Complete Trailer Line

Two Wheel Commercial Type
High Speed Auto Trailer
1250 lb. to 1500 lb. capacity

Two Wheel Heavy Duty Type
1½, 5½ ton capacity

Four Wheel Heavy Duty Type
2 to 7½ ton capacity

Power Transmission Semi-Trailer Type
10 to 15 ton capacity

Drop and Straight Frame Semi-Trailer Type
2½ to 11 ton capacity
(For ordinary transportation service)

WARNER
TRUCK CONVERTING
SEMI-TRAILERS

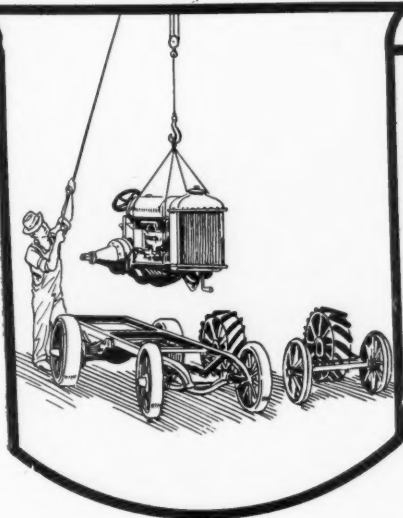
WARNER MANUFACTURING CO.

Dept. 10

BELOIT

WISCONSIN

Toppins Truck Unit with Fordson Power Plant



Utilizes the Fordson Power Plant

With a compensating chain and pulley, or other common hoisting device, your customer can readily transfer his Fordson power plant to the Toppins Tractor Truck Unit. The entire operation can be completed in as short a time as would be required to get a team of horses ready and harnessed.

Opens a New Money Making Field for Fordson and Other Dealers

With the Toppins Tractor Truck Unit, your customer can have a Fordson for field work—and a high-grade 2½ ton capacity worm or chain drive truck (that can make a speed of 18 miles per hour) to haul his produce to market.

Both together will cost him only half the price of a good make of truck.

The Toppins Tractor Truck Unit operates on kerosene. It halves the fuel bills of other trucks which *must* use gasoline.

Its Fordson power plant upkeep cost is naturally much less than for that of the average heavy-duty truck—as you know.

And Fordson service is practically universal.

Every Fordson user will quickly see the economy of buying a Toppins Tractor Truck Unit—to increase his earning capacity at little additional expense.

Here's a new money-making field for live dealers and distributors.

Wire or Write IMMEDIATELY
Territory Being Allotted NOW



Toppins Tractor Truck Company
Milwaukee Wisconsin

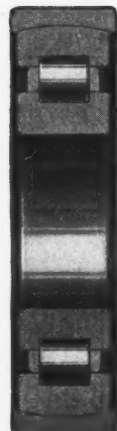
HOFFMANN

PRECISION ROLLER BEARINGS



"R" TYPE

Made to standard metric dimensions in light, medium and heavy series. Interchangeable in size with standard ball bearings. Made to inch dimensions in light and medium series.



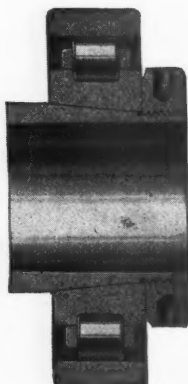
"RN" TYPE

Self-aligning

Made to metric dimensions in light, medium and heavy series. Made to inch dimensions in light and medium series.

"RT" TYPE

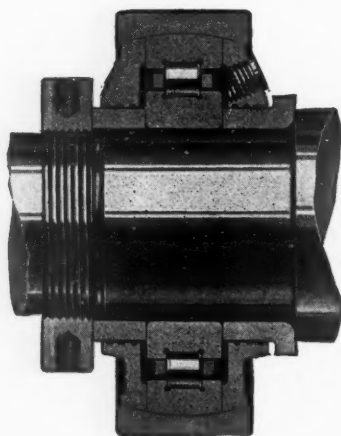
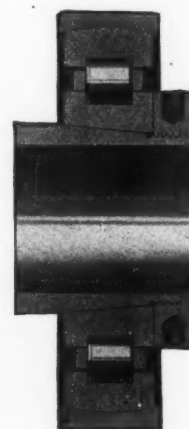
Equipped with clamping sleeve and nut. Made to inch dimensions in light and medium series.



"RTN" TYPE

Self-aligning

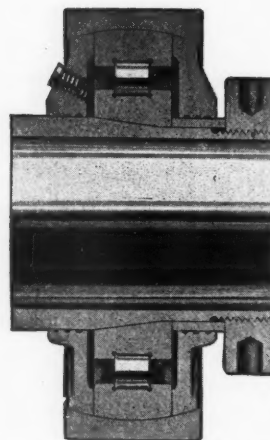
Equipped with clamping sleeve and nut. Made to inch dimensions in light and medium series.



"RSW" TYPE

Self-aligning

Equipped with side plates for protection from dirt and moisture. Made to inch dimensions in light and medium series.



"RTW" TYPE

Self-aligning

Equipped with clamping sleeve and nut and provided with side plates for protection from dirt and moisture. Made to inch dimensions in light and medium series.

Our engineers will welcome an opportunity to work with yours, in the application of these high-duty precision bearings with a view to securing maximum anti-friction efficiency

THE NORMA COMPANY OF AMERICA

Anable Avenue

Long Island City

New York

Manufacturers of "NORMA" Precision Ball Bearings

THIS SYMBOL IN ANY ADVERTISEMENT MEANS: SEE "CHILTON AUTOMOBILE DIRECTORY" FOR COMPLETE BUYING INFORMATION

IN the first three months of this year, GMC sales passed all previous records—not excepting the famous prosperity of 1920.

This means two things to every motor truck dealer.

GMC dealers are making money and the public is buying GMC trucks in greater numbers.

There is an opportunity for a GMC franchise in any community that has no representative. Get your name on file.

GENERAL MOTORS TRUCK COMPANY — Pontiac, Michigan
Division of General Motors Corporation

General Motors Trucks



Ⓜ THIS SYMBOL IN ANY ADVERTISEMENT MEANS: SEE "CHILTON
AUTOMOBILE DIRECTORY" FOR COMPLETE BUYING INFORMATION Ⓜ

MacDonald Model "O" Truck

Mechanically Superior

Economical

Dependable

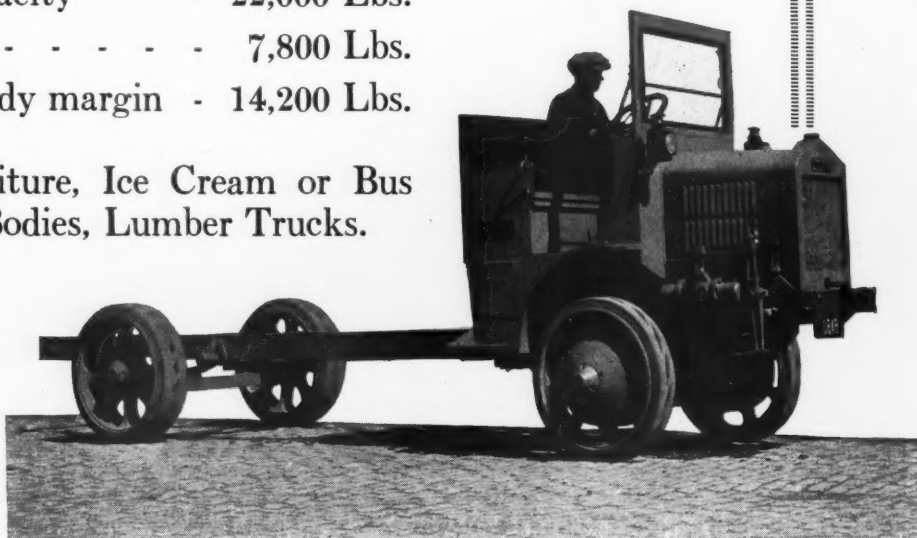
Guaranteed capacity - - - 22,000 Lbs.

Chassis weight - - - - 7,800 Lbs.

Pay-load and body margin - 14,200 Lbs.

For Van, Furniture, Ice Cream or Bus Bodies, Dump Bodies, Lumber Trucks.

Chassis height above ground from 18" to any dimension required.

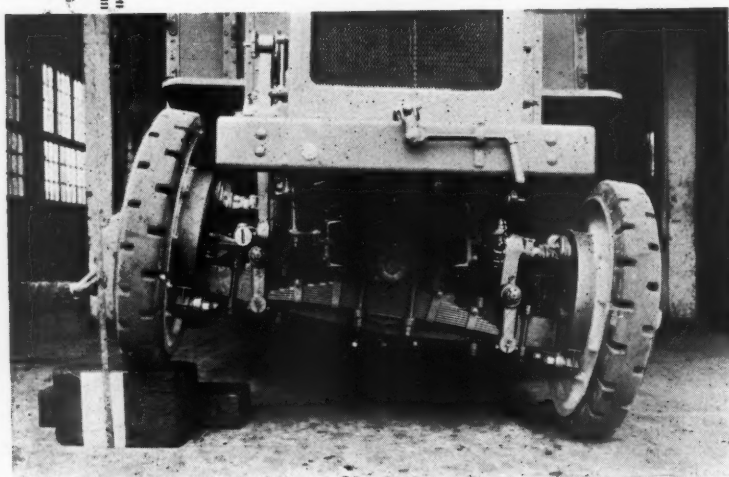


We Invite Attention to the Following:

Simplicity of Rear Axle Construction.

Superior Mechanical Construction of Front Axle.

Three point support of chassis on axles resulting in elimination of all frame weaving effect.



Front Wheel Drive.

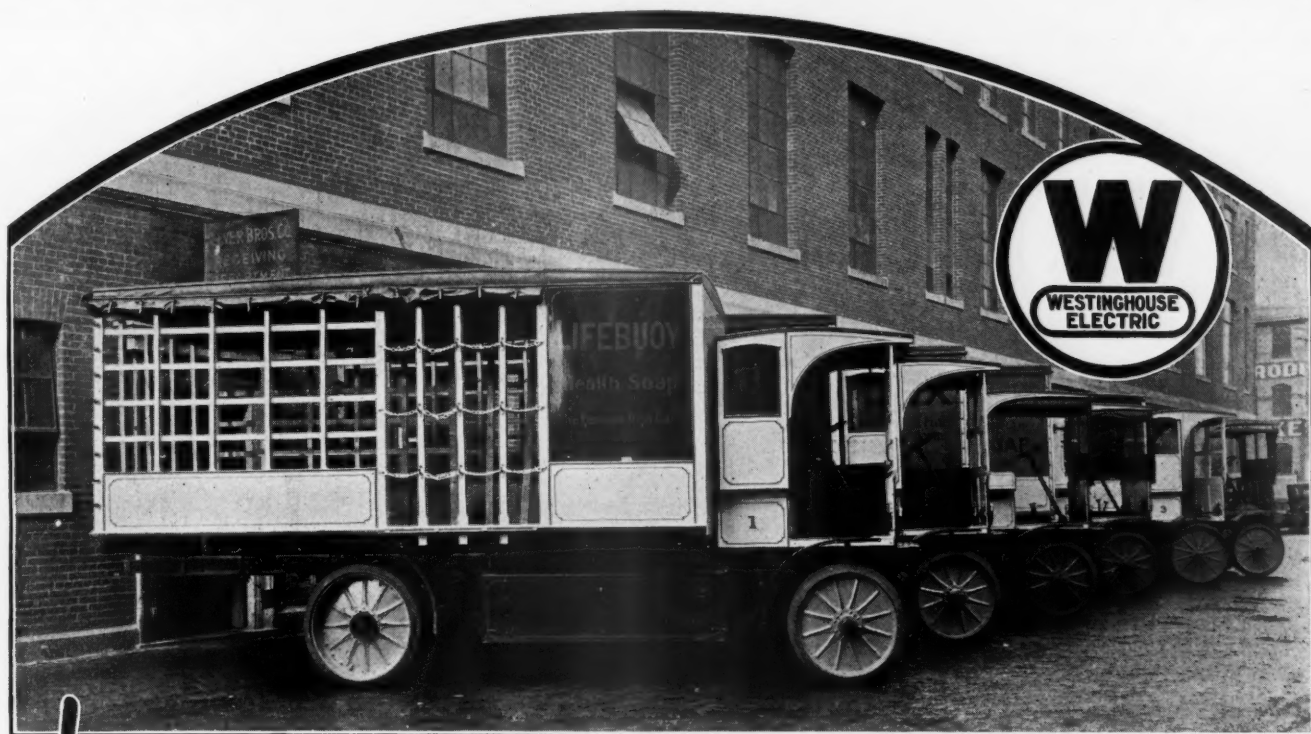
Before you buy another truck investigate the MacDonald.

Shipment from stock.

Literature on request.

MacDonald Truck Division—Union Construction Company

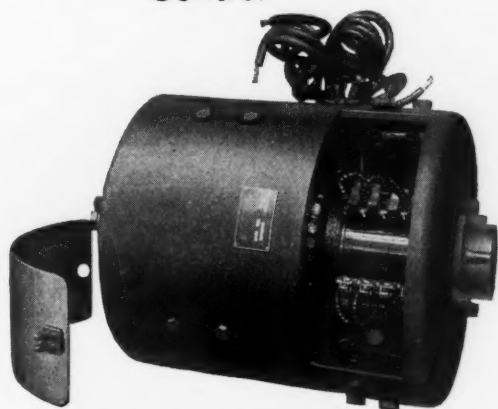
Main Office
351 California Street San Francisco, Cal.
Sales and Service Stations
Los Angeles, Cal. Honolulu, T. H.



The Electric Truck is a Profitable Investment



Westinghouse Vehicle
Control



Westinghouse Vehicle
Motor

because of its year-round reliability for uninterrupted delivery service.

It has economy, ease of operation, speed, simplicity of construction and long life.

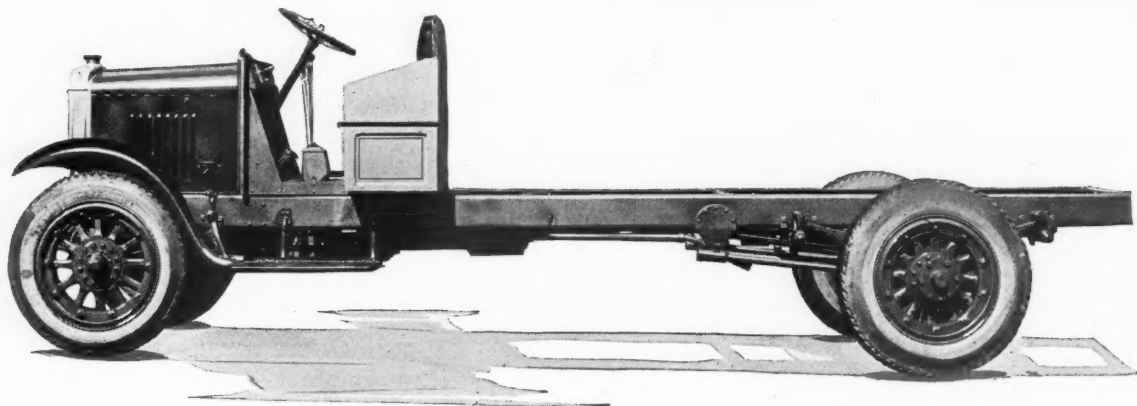
The many large fleets of electric trucks now in service prove it to be most profitable and reliable.

Use electric trucks equipped with Westinghouse motors and controllers. They have demonstrated their reliability in actual operation.

Westinghouse Electric and Manufacturing Co.
EAST PITTSBURGH, PA.

Westinghouse

Commerce Has Been Building Quality Trucks Since 1910



FOR over twelve years the Commerce Motor Truck Company has been building quality trucks—that have stayed sold.

The thoughtful dealer will do well to investigate this specialized line—and the company behind it.

You'll be surprised to learn how many 1910 Commerce Trucks are efficiently coping with 1923 haulage problems.

You'll be further agreeably impressed by the fact that Commerce dealers lay much stress on the financial stability and real co-operation of this twelve-year-old, ably-managed company.

Model 25 2½ Ton Capacity

Compare this rugged Commerce Truck with any other make of like capacity. You'll agree it's just about the finest truck value any dealer ever had the pleasure of offering. A specialized 2½ ton job powered with Continental Red Seal K-4 motor and other equally superior units.

Before You Turn This Page—Write for Details of the Worth-while Commerce Franchise



Model 9
Speed
Truck

1500 to 2500 pound payload capacity. A real husky speed truck—a co-ordination of the best strictly truck units obtainable.

**COMMERCE
MOTOR TRUCK CO.**
Detroit Mich.

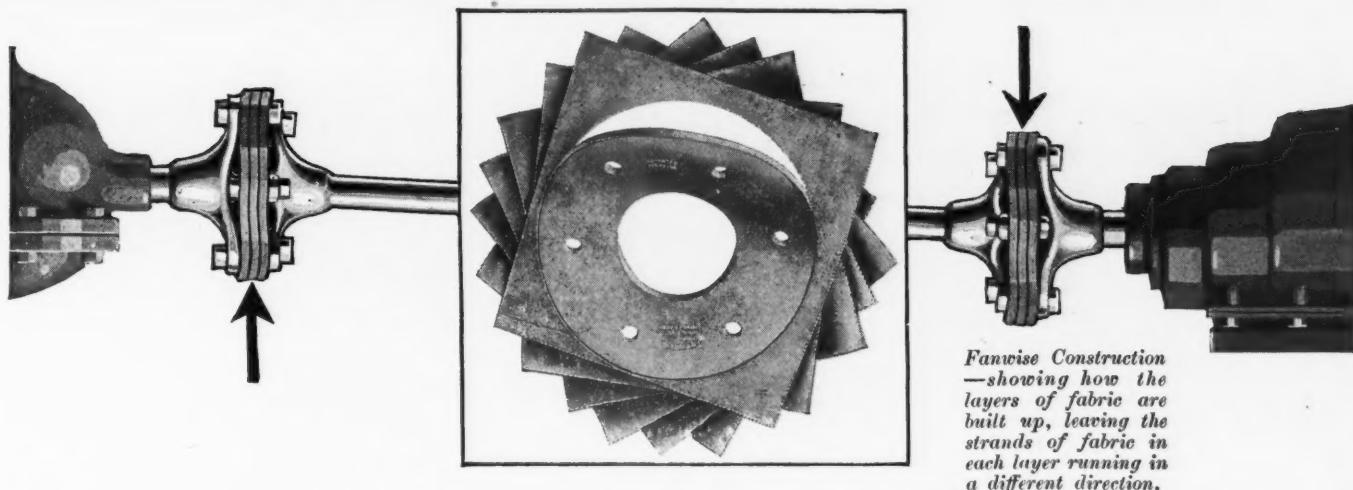
EXPORT DEPT.
132 Nassau St., New York City



Model 14
1½ Ton
Capacity

The all-round capacity for most haulage requirements. Note powerful Continental J-4 motor—positive Brown-Lipe Transmission—efficient Timken Worm Drive Rear Axle, etc.

Commerce TRUCKS



*Fanwise Construction
—showing how the
layers of fabric are
built up, leaving the
strands of fabric in
each layer running in
a different direction.*

An even stress at every point

Why the Thermoid-Hardy Universal Joint cannot stretch out of true

Every type of Universal Joint has three tremendous stresses thrown on it:

—the torsional, between the bolt holes

—the centrifugal, from the center outward

—the lateral, from the forward and backward motion of the shaft.

Yet the Thermoid-Hardy Disc, because of its Fanwise Construction, is the only universal which balances every one of these stresses.

The patented Fanwise Construction gives you the elasticity of fabric, the rugged strength of metal.

Unique construction gives Thermoid-Hardy balance

Take a look at the diagram above. Notice how the Thermoid-Hardy Joint is built up—the strands of each layer of fabric run in

a different direction. This gives each sector uniform strength and elasticity.

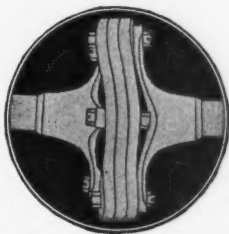
This eliminates the jarring jolts, the “whipping”—it affords a smooth, even flow of power from motor to rear axle. It keeps the shaft centered and true.

An ordinary fabric disc cannot do this. With two of the three driving bolts pulling on a bias—*across* the strands of cotton—the disc soon stretches out of true. “Whipping” of the entire shaft follows.

Thermoid-Hardy discs are now packaged for distribution through jobbers and dealers for replacement sales. Full information, prices, and discounts sent on request.

A book you should have

We have prepared a book, “Universal Joints—Their Use and Misuse”, that treats the subject from every angle—the mechanical principles, construction, lubrication, process of manufacture, strength, tests, and records of performance. Send for your copy today.



THERMOID RUBBER COMPANY

Sole American Manufacturers

Factory and Main Offices, Trenton, N.J.

New York	Chicago	Los Angeles
Detroit	Atlanta	Seattle
Kansas City	Boston	Cleveland
London	Paris	Turin
	San Francisco	

THERMOID-HARDY UNIVERSAL JOINT

*Makers of “Thermoid Hydraulic Compressed Brake Lining”
and “Thermoid Crolide Compound Tires”*

LIST OF USERS
Allis Chalmers Mfg. Co.
The Autocar Co.
Available Truck Co.
Barley Motor Car Co. (Roamer)
Chandler Motor Car Co.
Crow-Elkhart Motor Corp.
Jas. Cunningham Son & Co.
Dart Truck & Tractor Corp.
The Dauch Mfg. Co.
Diamond T Motor Car Co.
Doane Motor Truck Co.
Fageol Motors Co.
H. H. Franklin Mfg. Co.
Garford Motor Truck Co.
Gramm-Bernstein Motor Truck Co.
Hawkeye Truck Co.
Hendrickson Motor Truck Co.
Highway Motors Co.
Holt Mfg. Co.
Indiana Truck Co.
International Harvester Co. of A. Inc.
International Motor Co.
Jackson Motors Corp.
Kelsey Motor Co.
Kentucky Wagon Mfg. Co., Inc.
King Zeiler Co.
Lakewood Eng. Co.
Lexington Motor Co.
Locomobile Co.
Maxwell Motors Corp.
Menominee Motor Truck Co.
Mercer Motors Co.
Moreland Motor Truck Co.
Nelson & LeMoon
E. A. Nelson Automobile Co.
Nelson Motor Truck Co.
D. A. Newcomer Co.
O'Connell Motor Truck Co.
Oliver Tractor Co.
Oneida Motor Truck Co.
Packard Motor Car Co.
Parker Motor Truck Co.
Patriot Motors Co.
Reliance Motor Truck Co.
Reo Motor Car Co.
Reynolds Motor Truck Co.
Root & Van Dervoort Eng. Co.
Sanford Motor Truck Co.
Southwark Fdy. & Mach. Co.
Stoughton Wagon Co.
Studebaker Corp.
Stutes Mar Tractor Co.
Templar Motors Co.
Tioga Steel & Iron Co.
Towmotor Co.
Traffic Motor Truck Corp.
Transport Truck Co.
Twin City Four Wheel Drive Co., Inc.
United Motors Co.
Walter Motor Truck Co.
Ward La France Truck Corp., Inc.
Geo. D. Whitcomb Co.
Wichita Motors Co.
H. E. Wilcox Motor Co.
Willys-Overland, Inc.
Zeitler & Lamson
Truck & Tractor Co.

REPUBLIC STAG

*Real Profits—Quick Turnover
Satisfied Customers
Well Balanced Inventories*

THAT, "in a nut shell," is the story of Republic Truck Tire Distributors pushing the Republic Stag.

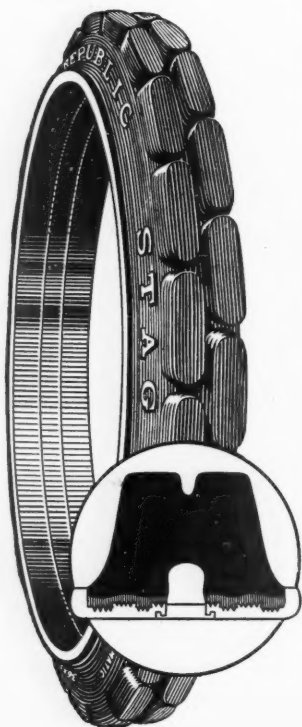
Why?—Two good reasons.

First, the Republic Stag is a 100% tire. It offers to its users the easy riding qualities of a pneumatic, the wonderful durability of Prodim Processed rubber with the traction and non-skid protection of the famous Republic Staggard Tread. Built to fit any type of wheel the Republic Stag has well earned its name of the all-in-one tire.

Second, the high standard of service set for and by Certified Republic Distributors has drawn trade to the door over which hangs the Republic "Sign of the Eagle."

If your service measures up to Republic standards, get in touch with our nearest branch today. Our franchise assures profits for you.

REPUBLIC STAG
A Solid Pneumatic,
Non-Skid Truck Tire
with a full contact
steel base that fits
every type of wheel



The Republic Rubber Company

YOUNGSTOWN, OHIO
DISTRICT HEADQUARTERS

New York
Kansas City

Chicago
Cincinnati

Philadelphia
Atlanta

Minneapolis
Pittsburgh

REPUBLIC TIRES

Ⓢ THIS SYMBOL IN ANY ADVERTISEMENT MEANS: SEE "CHILTON Ⓢ
AUTOMOBILE DIRECTORY" FOR COMPLETE BUYING INFORMATION Ⓢ

DUST PROOF

Like a Watch



As your customer's truck speeds along a dusty road, here is what happens.

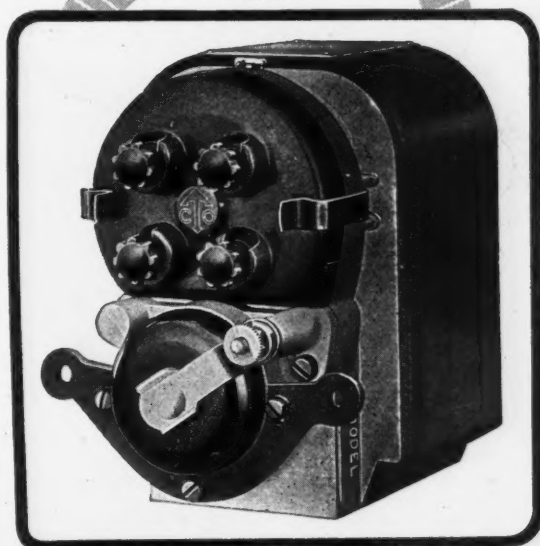
Through the radiator, the fan sucks in fine dust with the air—and blows it in a steady stream against the magneto. Dust swirls up from underneath the engine—and hovers about the magneto, seeking entrance to the coils, breaker points and other vital magneto parts.

If the magneto is a Teagle, dust *cannot* penetrate to interrupt the positive flow of the "juice" thru the working parts.

Built like a watch, with an air-tight case, this high-class magneto is absolutely *dustproof*.

Teagle construction insures, day in and day out, trouble-free magneto service.

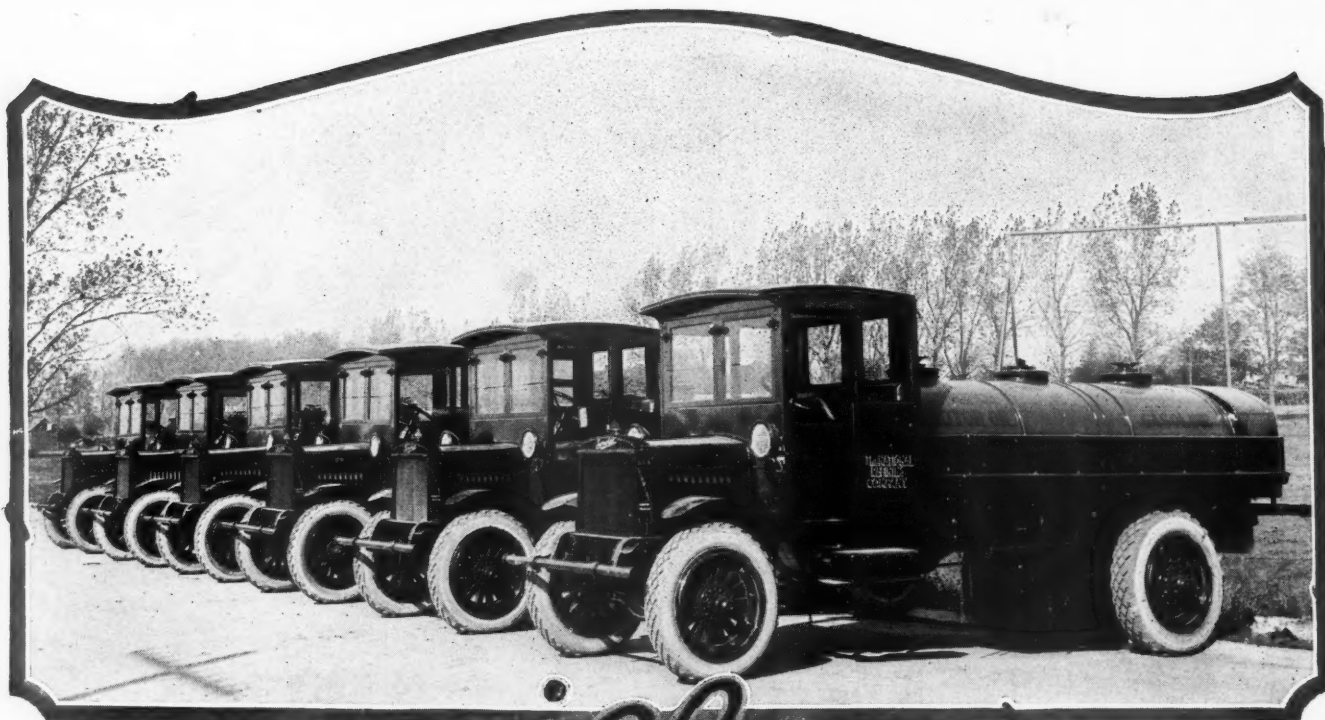
Specify Teagle—the reliable magneto.



The Teagle Co.
Cleveland, Ohio

TEAGLE

"The Simplest Magneto of Them All"



Service

MOTOR TRUCKS

Scientifically Cushioned

If you are to sell trucks to make money, satisfy yourself on the following points concerning contract you are asked to sign: 1. Age, stability and financial strength of manufacturer. 2. The truck itself. 3. Percentage of repeat orders. 4. Models to meet the needs of your territory. 5. Real co-operation. 6. The integrity and absolute fairness of the individuals who direct the policies. The Service contract fully meets these requirements. *Write for details.*

The Engine

The latest improved type Buda engine used in Service Motor Trucks is capable of maintaining high speed hour after hour, with no danger of failure, thus rendering unnecessary a complicated governor equipment.

Removable head, permitting easy accessibility; counterbalanced crankshaft, light pistons and connecting rods; special bearing construction which provides radiating surfaces for dissipating the heat that ordinarily ruins the older type of bearing; these are but a few of the features that have gained immediate acceptance of this motor from truck owners and dealers the country over.

Real profit to the truck dealer lies in *repeat business*, that 68% of all Service trucks built during the last seven years have been purchased by Service owners is conclusive proof that these trucks give their owners low cost transportation over a long period of years.

A Complete Line, ¾ to 6 Ton Capacities

LOOK FOR THE RED PYRAMID ON THE RADIATOR

SERVICE MOTORS, INC.

Manufacturers of Motor Trucks and Railroad Motor Coaches

Wabash, Indiana

Graham Brothers, Detroit, Mich. and Evansville, Ind. built this beautiful Vehisote panelled truck. Graham Brothers trucks are sold by Dodge Brothers dealers everywhere.



A 20 to 1 Shot!

DURING the year 1921 the Brooklyn, N. Y., Distributor for one of the three largest builders of commercial bodies in America was selling so few **VEHISOTE** (wood-fibre) Panelled Bodies that he was seriously considering the advisability of making no further effort to sell them.

Only the fact that he *knew* **VEHISOTE** made a *better* panel than *any other* material, caused him to hesitate taking such a course.

Then a change came about. Prominent business concerns began to report the wonderful performances of **VEHISOTE** Panelled Bodies under all conditions of wear and tear and weather. They began to *re-order* **VEHISOTE** at such a rate that during the month of March, 1923, this Distributor, without special effort on his part,

Sold 20 Vehisote Panelled Bodies to One Steel Body!

Draw your own conclusions. When you realize the fact that **VEHISOTE** (wood-fibre) Panelled Bodies, unlike steel, *cannot rust, rattle or squeak*; and, unlike an ordinary wood panel, *cannot split, crack or check*; and that when **VEHISOTE** is accidentally punctured, *only the damaged spot* need be repaired and repainted—meaning a great saving in both time and expense—then **YOU**, too, will recommend or specify

Jobbers Who Sell

VEHISOTE

THE SCOVEL IRON STORE CO., San Francisco and Los Angeles, Cal.
WATERHOUSE & LESTER, San Francisco, Cal., Los Angeles, Cal., and Portland, Ore.
E. C. KADOW & CO., Chicago, Ill.
MOSSMAN-YARNELLE CO., Fort Wayne, Ind.
WM. STOCKHOFF, Louisville, Ky.
A. M. WOOD CO., Charlestown, Boston, Mass.
MINNEAPOLIS IRON STORE CO., Minneapolis, Minn.
NICOLS, DEAN & GREGG, St. Paul, Minn.
THE FAETH COMPANY, Kansas City, Mo.
SLIGO IRON STORE CO., St. Louis, Mo.
W. T. CRANE CARRIAGE HARDWARE CO., Newark, N. J.
CHAS. SHICK & CO., Trenton, N. J.
N. LANGLER & SONS, Brooklyn, N. Y.
C. H. TIEBOUT & SONS, Brooklyn, N. Y.
H. D. TAYLOR & CO., Buffalo, N. Y.
H. HETT & SONS, New York, N. Y.
W. E. KLEINE & CO., New York, N. Y.
THE G. B. SCHULTE SONS COMPANY, Cincinnati, Ohio
GERHAB & LUDLAM, Philadelphia, Pa.
JACOB GERHAB, Philadelphia, Pa.
SHADBOLT & BOYD IRON COMPANY, Milwaukee, Wis.

TRADE **VEHISOTE** MARK

"A Better Body Pays"

THE PANTASOTE COMPANY

CHICAGO
Peoples Gas Bldg.

NEW YORK
11 Broadway

DETROIT
1446 Penobscot Bldg.



**United
Highway Special**

Capacity 500-2000 lb. Suitable canopy-panel or stake bodies for every business

Highway Special

From Every Viewpoint
proved a money-making line

A ROSTER of United Dealers throughout the country would show them to be leaders in successful merchandising.

They have put the United Line across in a big way, because the United product is right in design and quality; the result of twelve years' experience, and successful progress.

United Dealers are business men of the highest type. They show good judgment in securing the United Line while territory was open, and it has brought them big sales and satisfied customers.

The Highway Special

Just one of four popular models—all proved successes

The illustration shows the Highway Special; fine in appearance yet built for the hardest work, by men who *know*. Lowest in price of any real truck—serving from Coast to Coast and getting profitable repeat business.

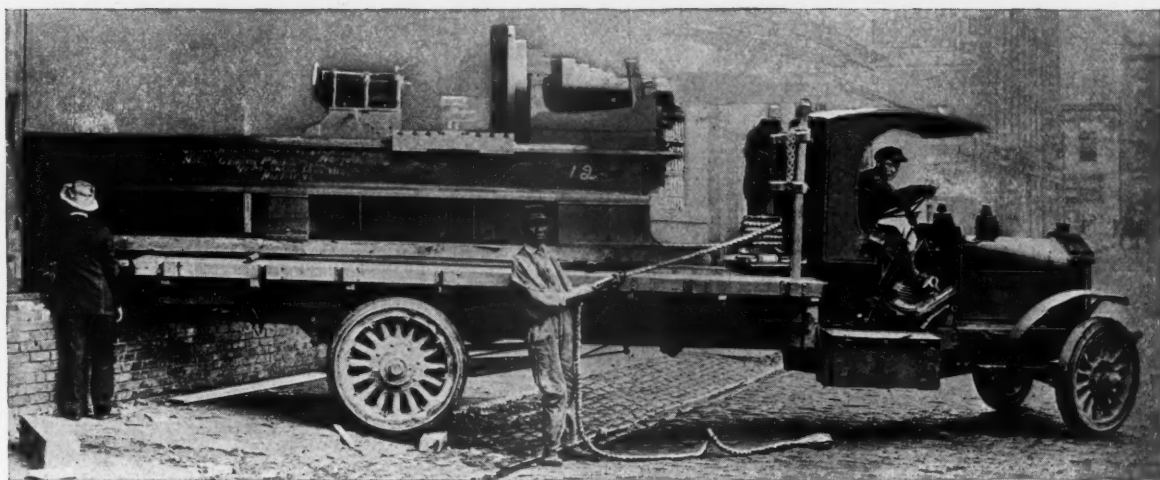
How Can YOU Qualify for This Opportunity?

We appoint only experienced truck and passenger-car dealers. If you are one of these, write and find out whether your territory is still open, for *you* to profit by the liberal United franchise.

UNITED MOTORS PRODUCTS COMPANY, Grand Rapids, Mich.

United

MEAD-MORRISON



Vertical Capstan Winches Keep Your Trucks Working

THE power wasted by your motor idling while you load and unload by hand could earn you \$15 or more per day per truck. Statistics show that the general truckman who has a Mead-Morrison Vertical Capstan Winch installed when he buys a truck meets his monthly payments on time. He can afford to—he uses the idling power of his engine to replace hand labor and speed up every job.

A Mead-Morrison Vertical Capstan takes but little deck room and is only a slight additional investment. Its life is 15 years or more, and it may be readily transferred to later truck models.

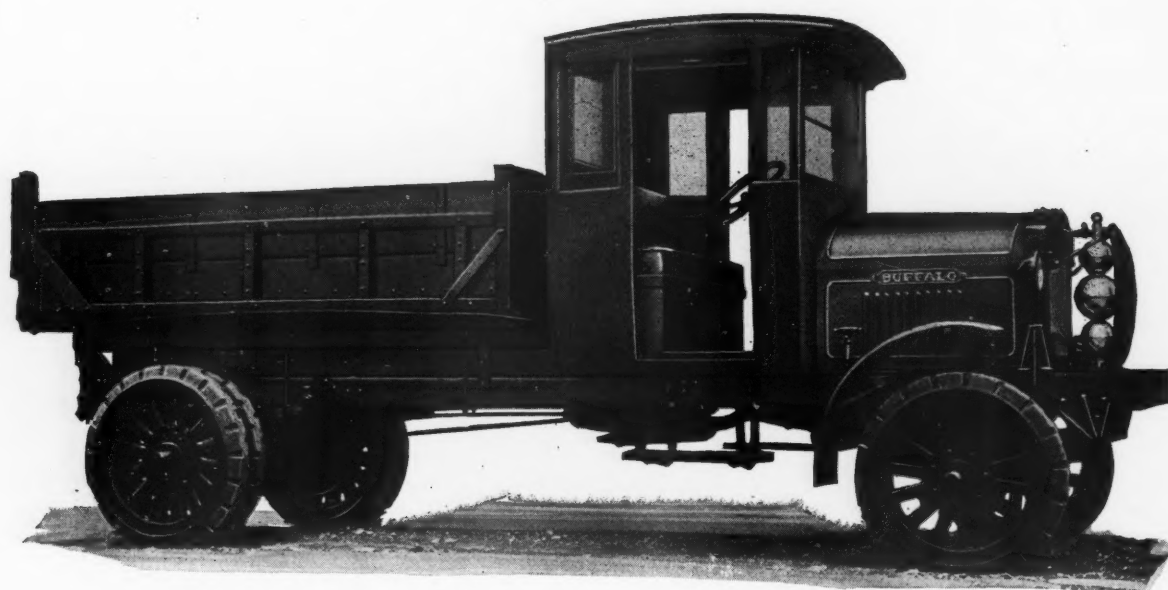
Let Your Engine Do The Work!

MEAD-MORRISON
MANUFACTURING COMPANY

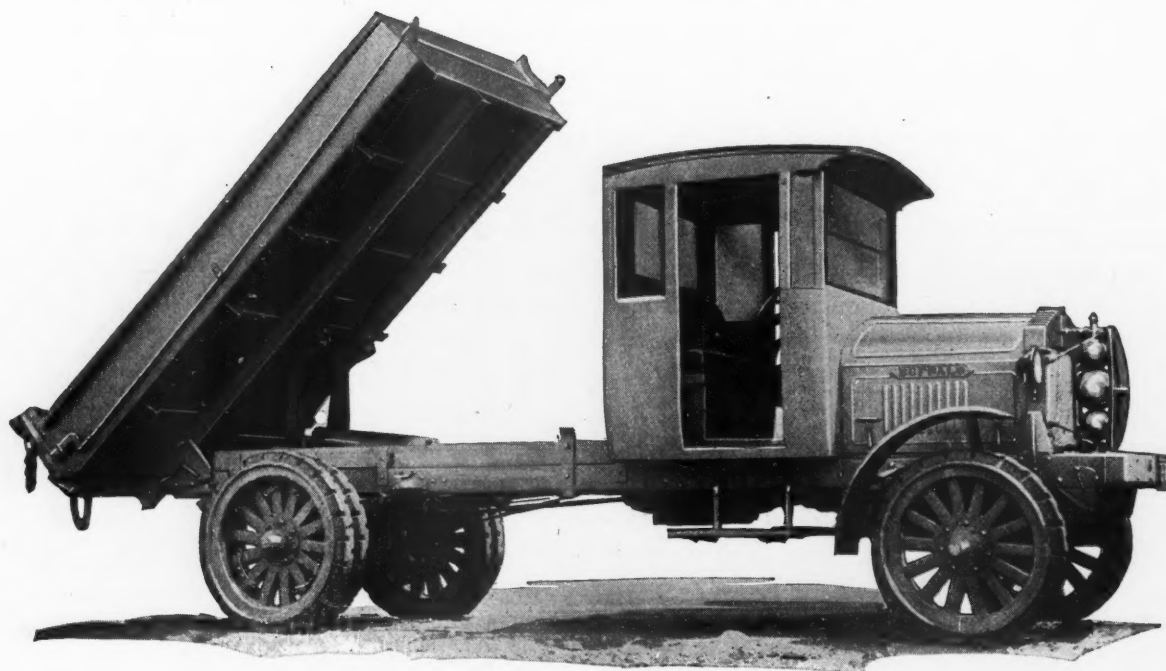
522 Prescott Street - - East Boston, Mass.

Multiplies Man-Power
HOISTING — HAULING — HANDLING

"BUFFALO" TRUCK



THE TRUCK THAT SELLS (DEALERS WANTED)



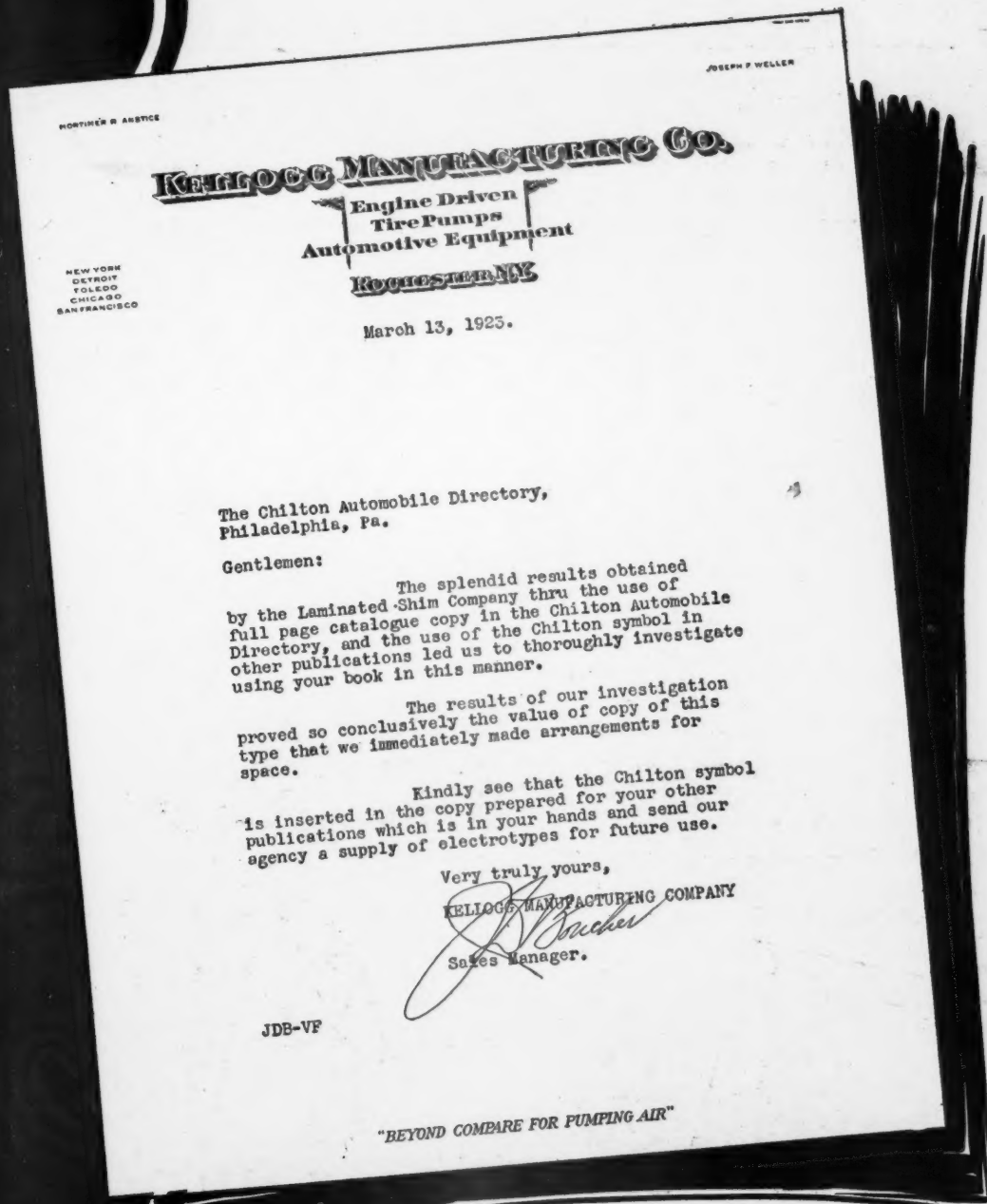
Buffalo Truck and Tractor Company

Factory: Clarence, N. Y.

Office: 1487 Main St., Buffalo, N. Y.

Ⓢ THIS SYMBOL IN ANY ADVERTISEMENT MEANS: SEE "CHILTON
AUTOMOBILE DIRECTORY" FOR COMPLETE BUYING INFORMATION Ⓢ

One Satisfied User tells Another.



Catalog *your* Line in the **CHILTON** **AUTOMOBILE DIRECTORY**

NEITHER vague statements nor abstract generalities have any place in advertising space in the CHILTON AUTOMOBILE DIRECTORY.

This book is *used* for purchasing by thousands of quantity buyers in all parts of the country. The advertisers in it have discovered that these buyers will often order right from the advertising, if that advertising contains specific buying facts.

Therefore, they are placing detailed purchasing data in their space, such as descriptions, prices, sizes, specifications—and the names and localities of branch offices, distributors or jobbers.

They have found that such facts facilitate purchasing, and encourage buyers to order immediately.

Incidentally, the CHILTON Symbol displayed in their other advertising has proved the means of directing buyers to the catalog data in the CHILTON AUTOMOBILE DIRECTORY.

Chilton Automobile Directory
Chestnut and 56th Sts. Philadelphia



The CHILTON Symbol appears in the trade advertisements of many prominent manufacturers as a sign to buyers that the manufacturers who display it have placed complete purchasing data about their lines in the

**CHILTON
AUTOMOBILE
DIRECTORY**

The CHILTON AUTOMOBILE DIRECTORY is the standard purchasing guide of the automotive industry. It is sent to practically all the quantity buyers in the business, who use it constantly for purchasing.





"ON THE GO SINCE 1916"



The complete line:

Model 31,	2,500 pounds
Model 33,	4,000 pounds
Model 35,	6,000 pounds
Model 27,	8,000 pounds
Model 210,	10,000 pounds
Model 214,	14,000 pounds

The true test of the worth of a motor truck is best shown in the constant service it gives, economically. There are few harder tests than that of ice hauling, yet, in the service of the largest ice company in the United States there are 104 Denby trucks—a completely standardized fleet.

We have a sales plan in which every wide-awake dealer will be interested. There are several fields in which truck selling activity will be especially notice-

able this year. We have already prepared the way for a few dealers to cash in on some of this business. Perhaps we can get together to mutual advantage.

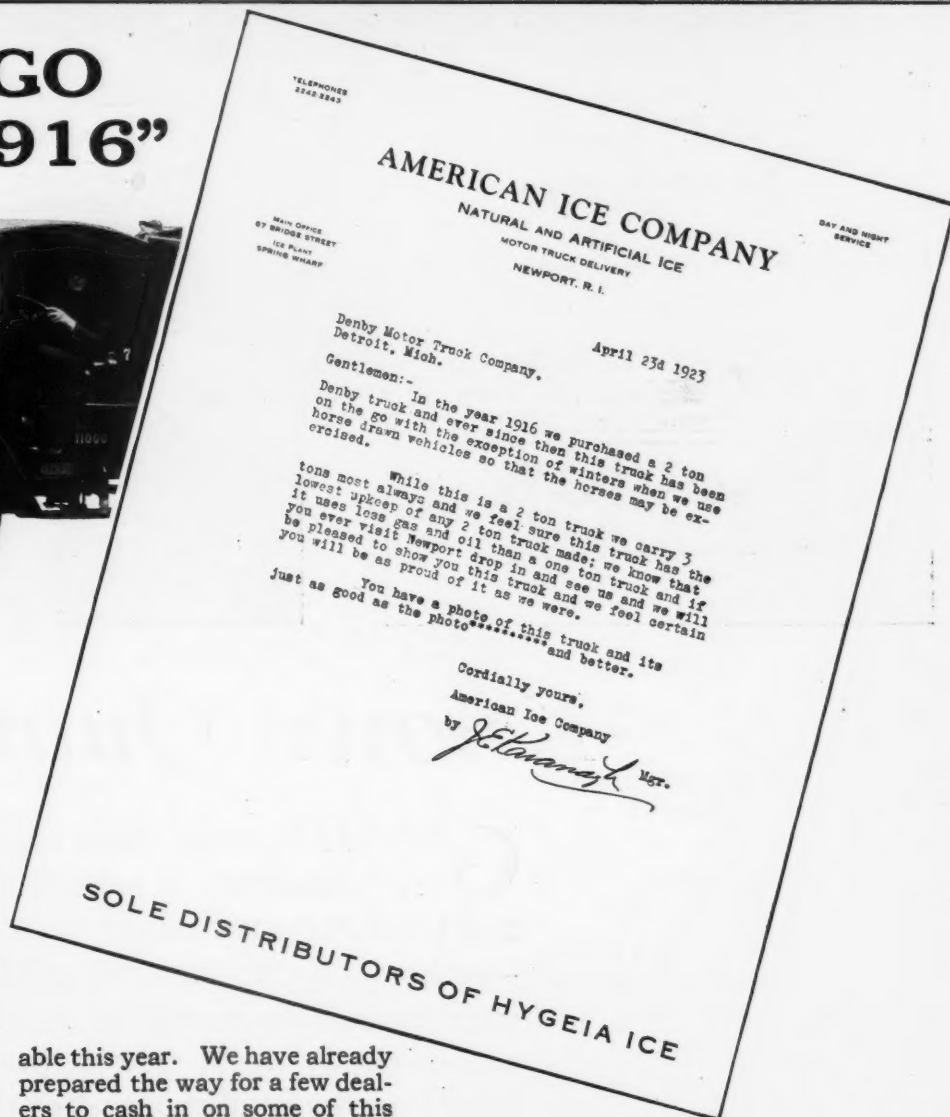
Write today, addressing Dept. V.

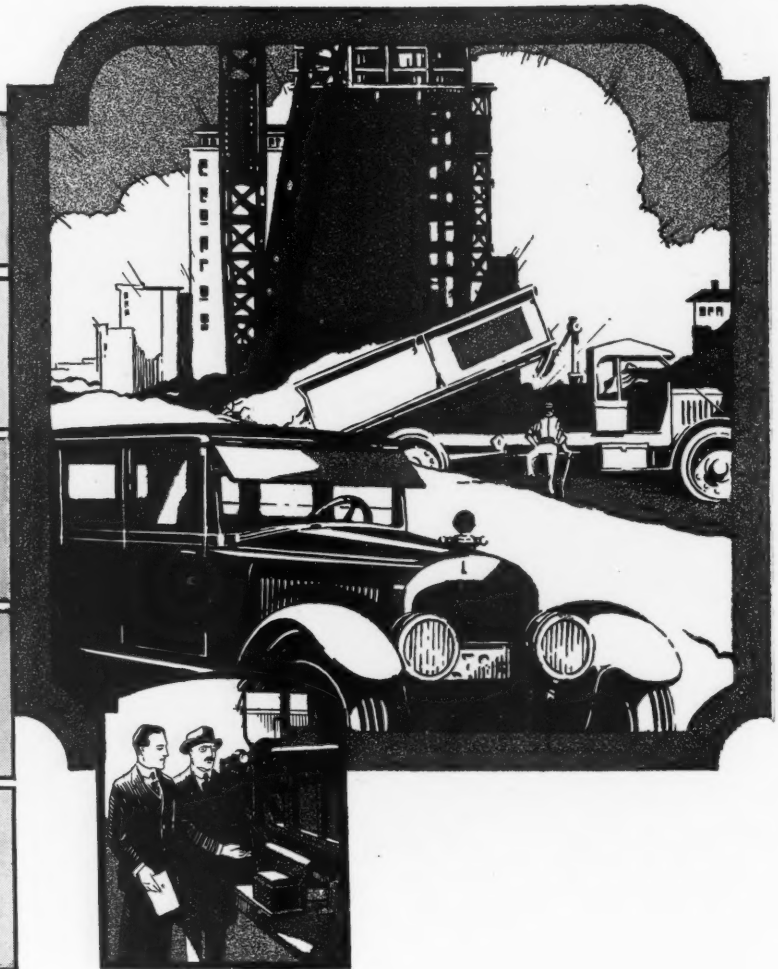
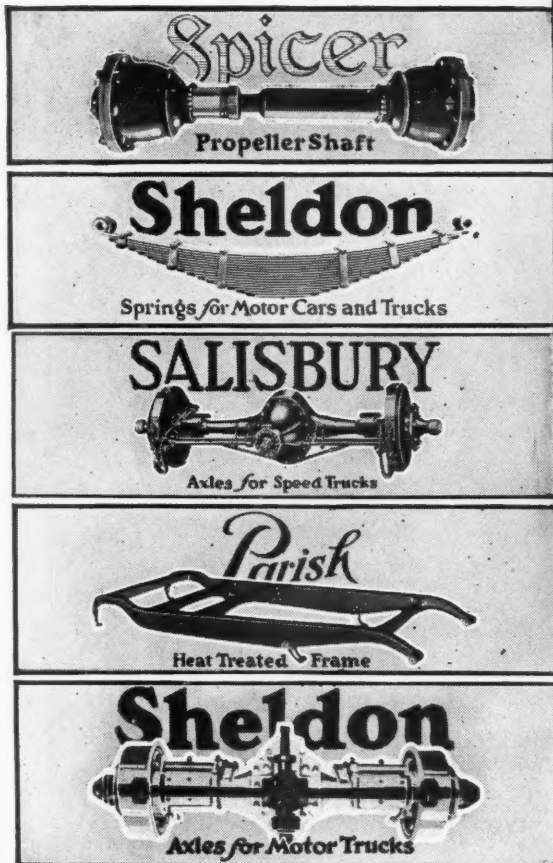
DENBY MOTOR TRUCK CORPORATION

DETROIT, MICHIGAN



THIS SYMBOL IN ANY ADVERTISEMENT MEANS: SEE "CHILTON AUTOMOBILE DIRECTORY" FOR COMPLETE BUYING INFORMATION





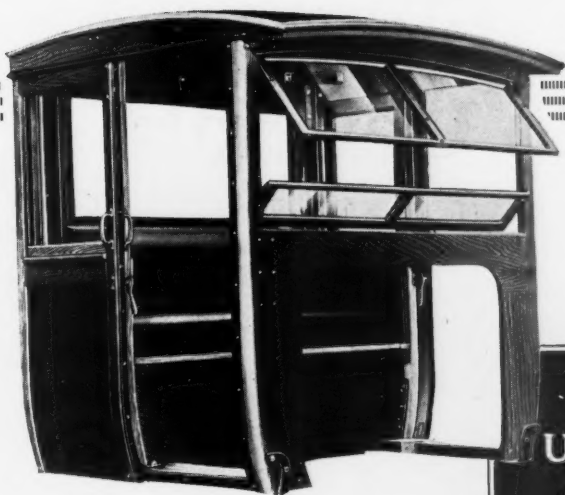
Known Quantities

GREATER to-day than ever is the public's tendency to select its motor cars and trucks on the basis of *known quantities*—units which are the product of specialized engineering; units whose reputations are established; units whose performances have had the infallible test of time.

Load-carrying and power-transmitting parts like Spicer, Sheldon, Salisbury and Parish make choosing easy.

Parish Mfg. Corp., Reading, Pa., and Detroit, Mich.
Sheldon Axle and Spring Co., Wilkes-Barre, Pa.
Salisbury Axle Company, Jamestown, N. Y.
Spicer Mfg. Corporation, South Plainfield, N. J.

C. A. DANA, *President*



Truck Manufacturers

Equip your models with RAIN OR SHINE Cabs. Your dealers will appreciate it.

**RAIN OR SHINE CAB
UNQUALIFIED GUARANTEE**

The General Woodwork Corporation unqualifiedly guarantees to replace any RAIN OR SHINE CAB that does not hold up in service.

Distributors!

Get Behind the Only Unqualified Cab Guarantee

The fine looking RAIN OR SHINE Cab is the *only* cab which carries an unqualified guarantee from the manufacturer to replace any cab that does not stand up.

If you prove acceptable as a RAIN OR SHINE Cab Distributor, you will have considerably more than this astonishingly liberal guarantee to advance as a convincing selling feature.

The RAIN OR SHINE Cab's high-grade wood and steel construction incorporates the best qualities of the all-wood and all-steel makes—without their drawbacks.

It is non-conductive to heat and cold—therefore is cool in summer and not an "ice box" in winter.

Its flexibility enables it to absorb road shocks easily. It will neither rattle nor rumble—and it l-a-s-t-s.

These superior advantages, in addition to the Unqualified Guarantee, assure fast cab profits for the distributor who knows how to make the most out of an all-the-year truck necessity.

Let Us Hear From You!

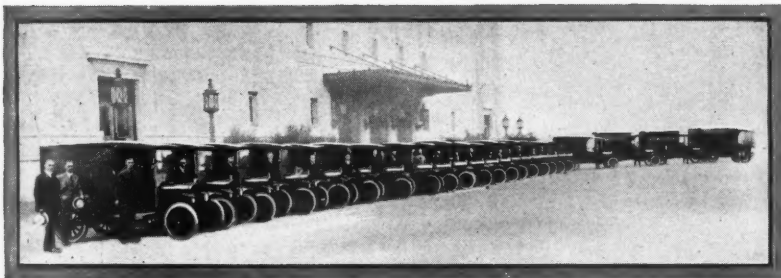
GENERAL WOODWORK CORP.

Cincinnati, Ohio

RAIN OR SHINE

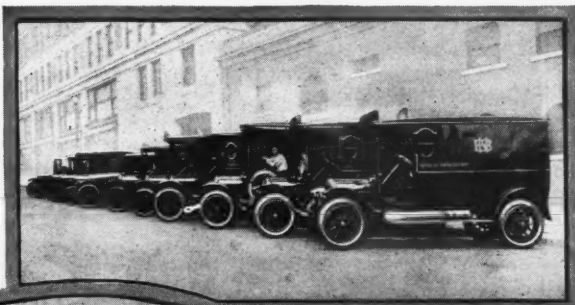
TRUCK CABS

Department Store Fleets Swing to Generals



"Our 10 trucks are equipped with Generals, and we intend to continue using them," writes the United Transfer Co., of Tampa, Fla., handling delivery work for department stores, in addition to moving, packing and storage.

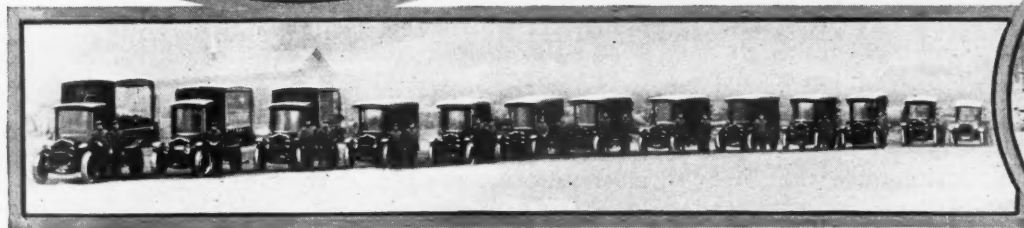
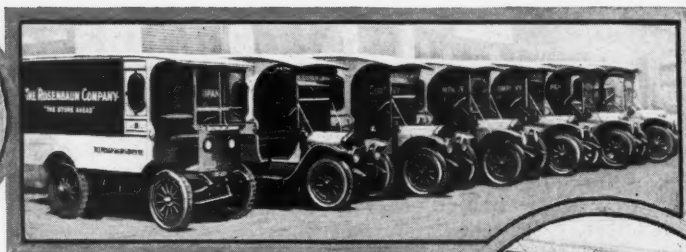
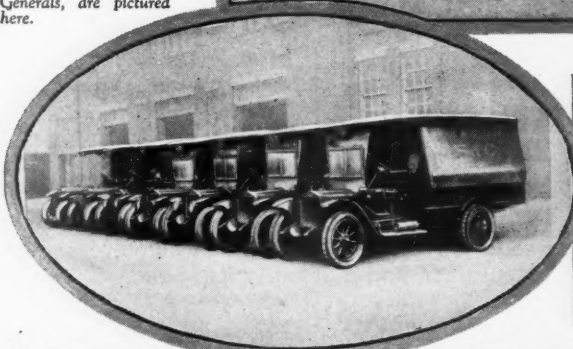
Strawbridge & Clothier, the famous Philadelphia department store, have used Generals for years to keep up their reputation for prompt service and hold tire bills down. Some of their delivery trucks, all equipped with Generals, are pictured here.



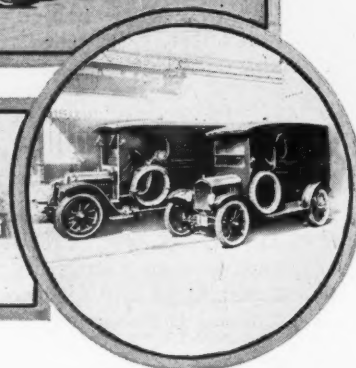
11 delivery trucks of the Burgess-Nash Company, the prominent department store of Omaha. 100% General equipment insures real tire mileage and low cost per mile.



After tests in service with other tires over Pittsburgh's hilly streets, the Rosenbaum Company, one of Pittsburgh's leading department stores, standardized on General Cords. Part of their fleet, with a General on each wheel, is shown here.



13 in this row — and all ride on Generals. It's the fleet of the H. & S. Pogue Company, one of Cincinnati's leading department stores.



19,000 miles in 18 months of service. That's the record of two Generals, recently taken off the rear of a $\frac{3}{4}$ -ton truck of the L. P. Hollander Co., of Boston. After two years' experience with Generals, this company would not consider using any other tires.



—goes a long way
to make friends

THE GENERAL CORD TIRE

THE GENERAL TIRE AND RUBBER COMPANY, AKRON, OHIO, U. S. A.

THIS SYMBOL IN ANY ADVERTISEMENT MEANS: SEE "CHILTON
AUTOMOBILE DIRECTORY" FOR COMPLETE BUYING INFORMATION

Hiflex and Radio

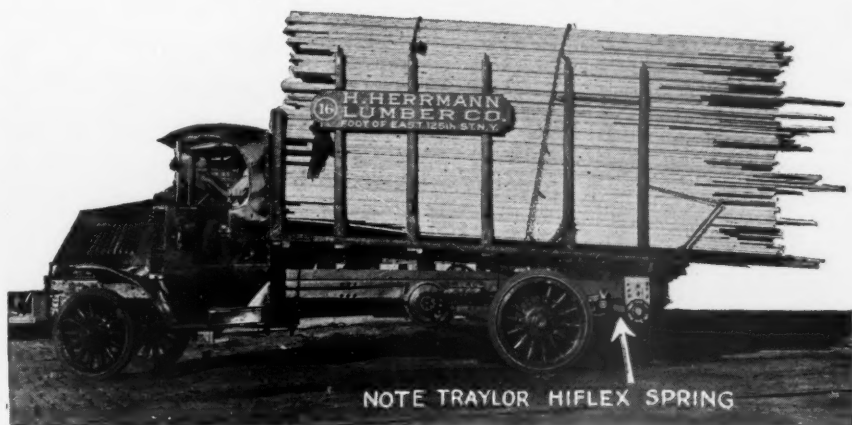
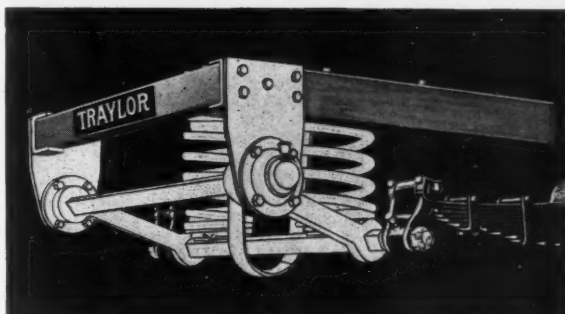
TWO OF THE MOST POPULAR AND IMPORTANT INVENTIONS OF THE DAY

HIFLEX is Important Because It is Saving Truck Owners Time and Money in Repairs and Adding Miles to the Lives of Their Trucks

HIFLEX Will Do the Same for You

FLEET OWNERS

who have tried HIFLEX invariably come back with repeat orders; they cannot afford to operate their trucks without them. Repeat orders surely prove HIFLEX is meeting our claims.



HIFLEX consists of two giant helical springs and a hinge. These springs are prevented from acting independently, as the connecting hinge compels them to function together. Instead of one or the other absorbing impacts independently, the springs combine forces and work together regardless of which side the impact occurs. By thus combining the action of these two powerful coil springs, the rigid hinge provides stability, floats body and load; checks and absorbs vibration.

Dealers Write for Our Sales Proposition

Traylor Engineering & Manufacturing Co.

ALLENTOWN, PENNA.

Factory Branches:

PHILADELPHIA: 921 Thompson St.

NEW YORK CITY: 218-226 Spring St.



Ⓢ THIS SYMBOL IN ANY ADVERTISEMENT MEANS: SEE "CHILTON AUTOMOBILE DIRECTORY" FOR COMPLETE BUYING INFORMATION Ⓢ

THE PATH TO SALES

in a Billion-Dollar Field

Leads to the 10,000 Trade Readers of the COMMERCIAL CAR JOURNAL

Other paths lead to buyers also, but they are not as *direct*, not as *short*, not as *convenient*. The COMMERCIAL CAR JOURNAL offers you the most rapid and effective means of reaching the important part of the motor truck trade. It affords the surest method of approaching buyers who are constantly in the market for new lines, supplies and equipment.

Over ten thousand such men, the pick of all the buyers in the industry, are subscribers to it. These men are progressive. They are open to new ideas.

They can be readily induced to invest much time and money, if they are convinced they can make a profit.

Nowhere else does a truck-trade audience of the size and importance of this one exist. No other commercial-car trade publication has ever assembled such a mass of important readers. The number of those who subscribe to the COMMERCIAL CAR JOURNAL is greater than the trade circulation of all other publications in the field.

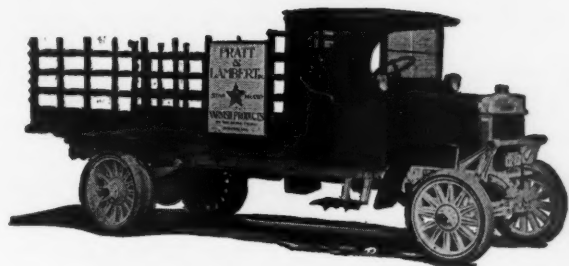
It will pay you to cultivate this great trade audience. Consistent advertising in the JOURNAL will acquaint these buyers with your product and its merit. Orders will follow, for the market is tremendous, and these men must buy somewhere.

COMMERCIAL CAR JOURNAL

It Dominates a Billion-Dollar Field

Chestnut and 56th Streets

Philadelphia



When you are up against competition

That's when it's worth while to be able to not only talk quality but show it.

That's when the exclusive Atterbury chassis design stands out and helps you sell the man who knows trucks.

That's when Atterbury dealers cash in on the results of our twenty years' experience in building motor trucks and nothing but motor trucks.

You will surely be interested in a portfolio showing some of the reasons why you can overcome competition with Atterbury trucks.

Send for the portfolio today, as this is the busy season.

ATTERBURY MOTOR CAR COMPANY
Elmwood Ave. at Hertel Buffalo, N. Y.



1903-1923
TWENTIETH ANNIVERSARY



Save Weight

THE Gurney Radio-Thrust Bearing will take both the radial and the thrust load. It occupies less space than two separate bearings—has longer life and renders dependable service. Why use two bearings where one will answer the purpose? Simplify design—Save money.

Gurney Engineers—many years' experience—are at your disposal on bearing questions.

Gurney Ball Bearing Co.
Conrad Patent Licensee
Jamestown, N. Y.

(18148)
GURNEY
BALL BEARINGS



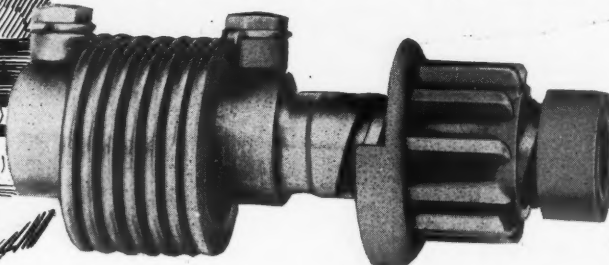
**Each Idling Hour Costs
1 3/4 Gal. of Gas**

BENDIX DRIVE

for Electric Starters on Trucks

Automatic
Engaging and
Disengaging

BENDIX
DRIVE



As long as truck drivers must crank their engines, they will let them "idle" while standing. Each idling hour costs 1 3/4 gallons of gas. An hour a day costs over \$100 a year.

Numberless engines have been ruined because an oil line, pump or radiator has clogged while their drivers left them, idling. Incalculable damage to universal joints, jack shafts and gear sprockets has resulted from drivers coasting down grade and throwing in the clutch to start.

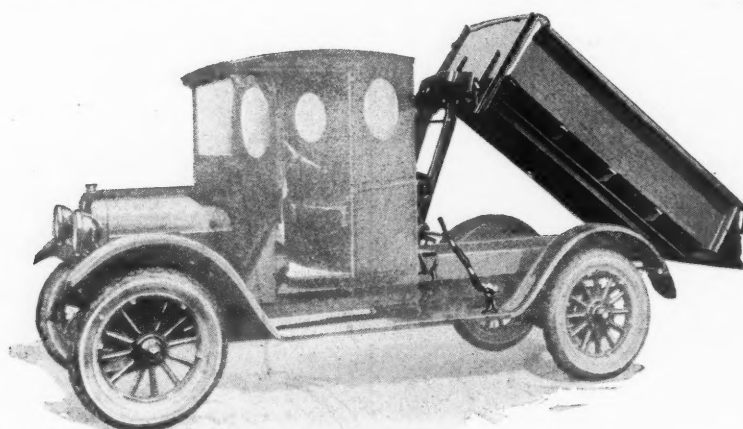
Drivers whose trucks are equipped with electric starters *don't do these things*. The saving is the truck owner's.

Bendix Automatic Drives for electric starters are absolutely automatic—certain in action—with fewer parts than any other drive. They require a minimum of care and attention.

An electric starter, equipped with the Bendix Drive, will save every truck owner money in the savings it will effect. Let us show you.

Eclipse Machine Company

Elmira, N. Y.



STRENGTH—

Galion Allsteel Dump Bodies are built to stand the strain of constant use. The heavy angle irons which support the body, the electrically-welded construction, and the ten-gauge metal used throughout insures a long period of useful operation.

Durability is built into every Galion body—and there is a model for every requirement.

Write for your copy of our catalog

THE GALION ALLSTEEL BODY CO.

Galion, Ohio

Before You Specify the Transmission

Give a thought as to why the largest number of progressive motor truck makers standardize on

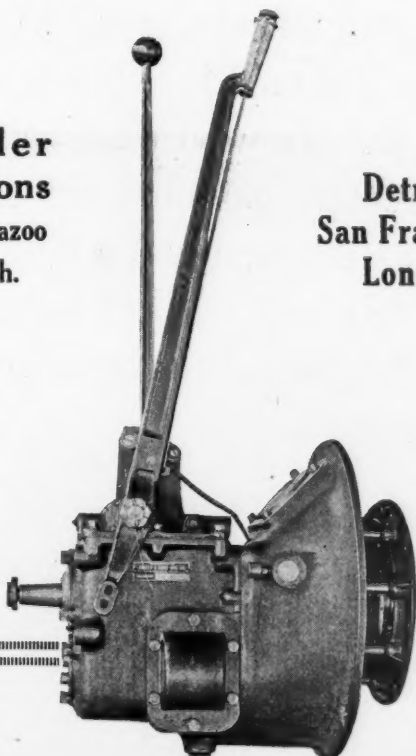
FULLER *Transmissions*

For 19 years these "Quality First" transmissions have upheld the quality standard of trucks built with the idea of quality first.

Why not let our engineers submit to you the convincing proofs of Fuller superiority? This will place you under no obligation whatsoever.

**Fuller
& Sons**
Kalamazoo
Mich.

**Detroit
San Francisco
London**



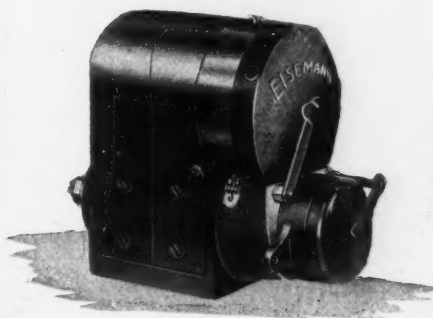
REPUTATION

FOR 22 years Eisemann has been the pioneer of magneto advancement, dating back to 1901 when Ernst Eisemann created the first jump-spark magneto.

Today the repeated and increased orders from Truck, Tractor and Engine Manufacturers demonstrate how much internal combustion engine advancement owes to the Eisemann Magneto. Thus building higher and higher the Eisemann reputation for reliability.

The inclusion of "Eisemann Ignition" in motor truck specifications is a selling factor no truck manufacturer or dealer can afford to overlook.

Submit your ignition problems to our Engineering Service. No obligation is entailed



EISEMANN MAGNETO CORPORATION
BROOKLYN, N. Y.

DETROIT CHICAGO SAN FRANCISCO

WHEELER RADIATORS



Help Make Repeat Truck Sales

Equip with the high-grade Wheeler Radiator, your truck will give your customer better service.

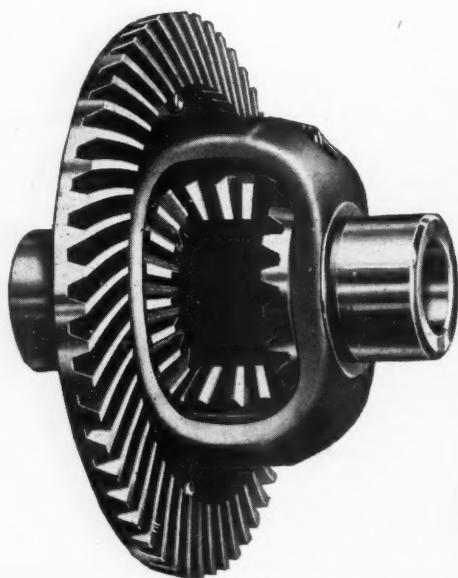
Wheeler Radiator construction provides the cooling system with maximum radiation service.

Your customer soon finds this out for himself—then, if all the other chassis units are of similar high quality, repeat truck sales naturally follow.

Specify Wheeler.

**The Wheeler Radiator
& Manufacturing Co.
East Cleveland, Ohio**

TO DEALERS: We can supply radiator shown here for Peerless truck replacement.



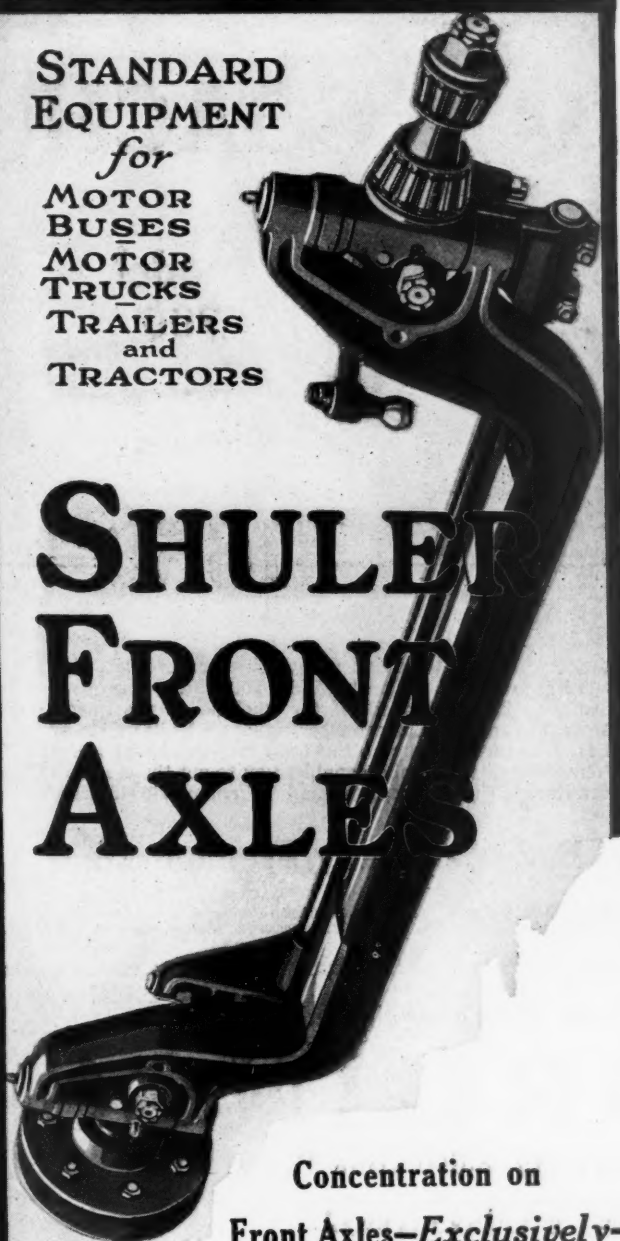
Ask any manufacturer of fine motor trucks. He will tell you that the Brown-Lipe-Chapin differential installed in the rear axle assembly is a unit of the highest caliber — one which enhances the reputation of the truck.

Manufactured at Syracuse, N. Y.

BROWN-LIPE-CHAPIN DIFFERENTIALS

STANDARD
EQUIPMENT
for
MOTOR
BUSES
MOTOR
TRUCKS
TRAILERS
and
TRACTORS

SHULER FRONT AXLES



Concentration on
Front Axles—Exclusively—
Produces Superior Product

The Shuler Axle Company builds front axles *exclusively*. We have concentrated all our experience and energy on this one vitally important major unit. This should mean—and *does*—that we are producing a distinctly superior front axle.

Shuler engineers are at your service to develop the greatest possible efficiency in your product through the use of the Shuler Front Axle that most satisfactorily meets your particular requirements.

We will be glad to furnish complete information to progressive manufacturers of motor buses, motor trucks, trailers and tractors.

SHULER AXLE COMPANY
INCORPORATED
3003 Jones Street Louisville, Kentucky, U. S. A.



*/// \$11.10 daily saving
x 300 working days
\$3330.00 yearly saving
///*

They save \$11.10 a day by cleaning with O.P.C. before electro galvanizing

\$3000 saved in a year—in addition to other advantages from cleaning their work with Oakite materials.

9000 auto rims are cleaned every day in this plant—and there is no more trouble from rejects, which used to be a serious expense. Oakite Platers' Cleaner gives a chemically clean surface, which insures a good galvanizing job.

All this work is put through with only 30 pounds of O. P. C. a day. They formerly used 130 pounds of other material. Besides the direct saving of \$11.10 a day due to greater efficiency of O. P. C. there is incidentally another real saving in freight and handling charges from cutting out 100 pounds of cleaner a day.

The changes in cleaning methods in this plant were simple, but they made a big difference in results, both in dollars and quality of work.

A little study by the Oakite Service man on the job—the application of technical and practical knowledge on the several factors involved—a clear-cut recommendation for an improved method of cleaning—and the results clearly show the value of his help.

It is an age-old truth—the more specialized knowledge and practical experience you can focus on any job, the better the results will be.

If you want to lower your cleaning costs or better your results, let us work with you. Oakite Service men are cleaning specialists.

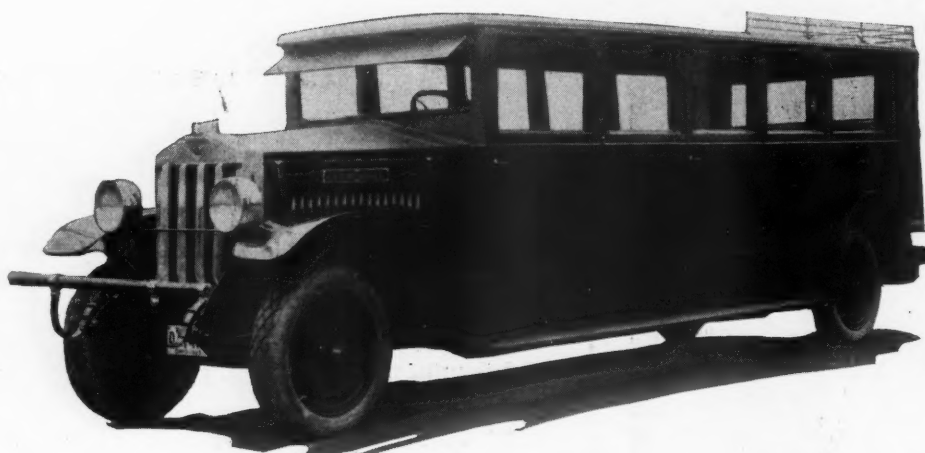
There are 65 Oakite Service men, cleaning specialists, located at: Allentown, Pa.; Baltimore, Boston, Bridgeport, Brooklyn, Camden, Cedar Rapids, Chicago, Cincinnati, Cleveland, Dallas, Dayton, Denver, Des Moines, Detroit, Erie, Evansville, Ind.; Grand Rapids, Greenville, N. C.; Harrisburg, Hartford, Indianapolis, Kansas City, Los Angeles, Louisville, Milwaukee, Minneapolis, Montreal, Newark, New Haven, Philadelphia, Pittsburgh, Portland, Me.; Poughkeepsie, Providence, Reading, Rochester, Rockford, Rock Island, St. Louis, San Francisco, Schenectady, Seattle, Toledo, Toronto, Utica, Waterloo, Williamsport, Pa.; Worcester.

Oakley Chemical Co. General Offices: 38 Thames St., New York, N.Y.

OAKITE

Industrial Cleaning Materials

FREMONT SEDAN COACH



Model
700

21
Passenger

\$1650⁰⁰

**Feature This
Superb
Bus Body**

Sight-seeing bus companies, touring bus lines and many other concerns are live prospects for the luxurious Fremont Sedan Coach Model 700. Rear door gives access to rear seats—which can be partitioned off for smoking compartment. Finest of materials, workmanship and appointments throughout. Built in 13, 17 and 21 passenger capacities. Feature this superb bus body on *your* chassis—for handsome profits. The Fremont Dealer Franchise enables you to get the cream of the bus business in your territory with the complete line of Fremont Bus Bodies. For details—*write now*.

Fremont Metal Body Company, Fremont, Ohio

DROP FORGINGS Stand First, Last and Always for Dependability

DROP FORGINGS

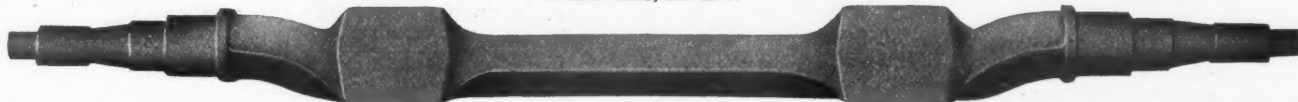
Open Hearth or Alloy Steel

Capacity, 2,000 Tons Per Month

TYPICAL TRUCK FORGINGS

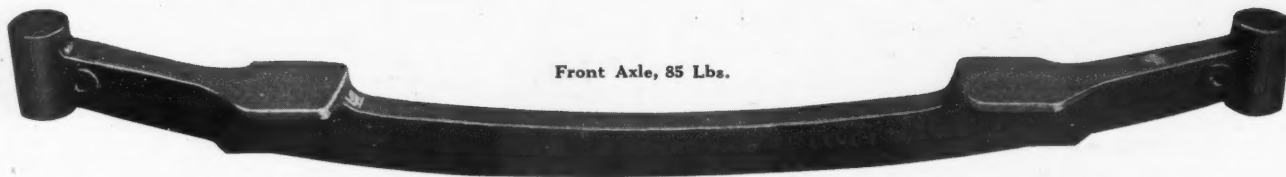
ANYTHING THAT CAN BE DROP FORGED UP TO 300 LBS.

Trailer Axle, 280 Lbs.



Overall, 85"

Front Axle, 85 Lbs.



Overall, 55"

BACKED BY FORTY YEARS' EXPERIENCE

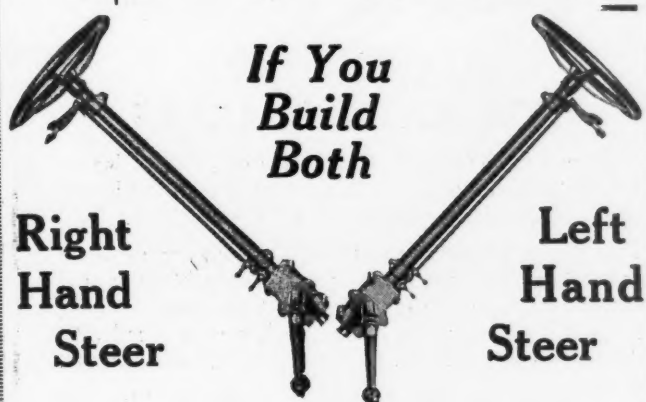
Heat Treating and Complete Laboratory Equipment

UNION SWITCH & SIGNAL COMPANY

PITTSBURGH DISTRICT

SWISSVALE, PA.

Use a Lavine



THE Interchangeability of the Lavine Will Interest You

The same stock gear is used for either right or left steer.

No Adjustment
No Machining
No Keeping Two Stocks

DOUBLY ATTRACTIVE IS THE FACT

That each and every part of the Gear itself is absolutely interchangeable.

HEAT TREATMENT
GIVEN PARTS
is Second to None

LAVINE GEAR CO.
MILWAUKEE WISCONSIN

You Standardize on Other Truck Parts Why Not Fenders?

Truck manufacturers and owners find that the use of standard motors, axles and important parts pays.

The use of standard fenders pays, for the reason that it decreases the cost of manufacturing the truck and the time of installation. It pays from a replacement standpoint, because standard fenders are easier to obtain and fit, and more profitable to service.

When it is remembered that one of the first parts of a truck to need replacements are the fenders, this economy produced by standardized fenders is particularly important.

Write Us for Full Information

Why not get the same percentage of increased service from the fenders on your truck that you do from other standardized parts? You can get this saving at no increase of cost by using "3M" standardized fenders.



Plain Top T3909



Assembled Flat Top A3909

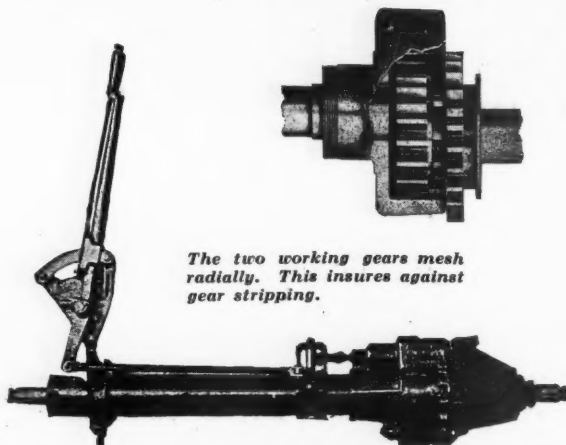
Motors Metal Mfg. Co.

Detroit

Mich.



Enables Mack Trucks to Pull Bigger Loads



AHLBERG DUAL TRANSMISSION

*for Mack—Packard—White—
Graham Bros.—Garford Trucks*

EASY PROFITS FOR MACK DEALERS

With worth-while profit for themselves, Mack dealers can do their customers a great service—by equipping their trucks with the Ahlberg Dual Transmission.

This truly remarkable transmission reduces standard gear ratios **62½ per cent.** Enables the Mack to pull bigger loads up steep grades without the usual bucking or straining. Gives the husky Mack greater speed with the same engine R.P.M. by increasing driving sprockets.

In addition, this time and money-saving transmission provides **6 speeds forward, 2 reverse.**

A Mack A. C. Model Transmission will cost your customer only \$276.50, including war tax, and additional Spicer joint, F.O.B. Los Angeles.

Ahlberg Transmissions also made for Packard, White, Graham Bros., and Garford trucks.

*Get your share of these easy
Ahlberg sales and profits. Write*

K. E. AHLBERG COMPANY
120 West 22d St. Los Angeles, Cal.



Our modern plant at Gary, Indiana, has a production capacity of 200 trucks monthly.

A Complete Quality Line

Give your customer the *exact* size quality motor truck he needs. That's the way to build *lasting* good-will—and repeat sales.

You are always in a position to give customers the most economical haulage units for their special requirements—if you handle the complete line of Gary quality trucks.

It includes 1, 2, 2½, 3½ and 5 ton capacities, as well as three special models that are in wide demand—two buses of 18 to 21 and 25 to 30 passenger capacity, and the Gary Oil Special. Prices are *low*—quality considered.

Learn whether your territory is still open. *Write.*

GARY MOTOR CORP.
Gary, Indiana

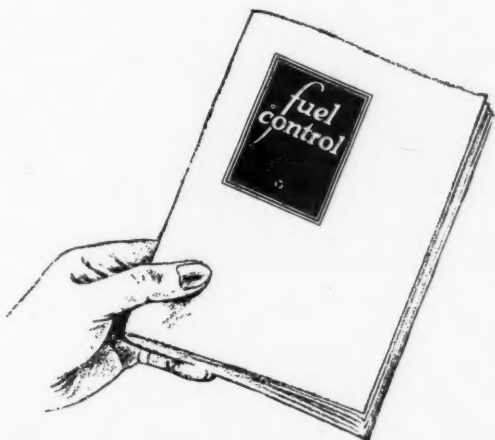


ZENITH

The Ten Best Trucks

Which, in your opinion, are the ten best motor trucks?

Turn to the specification tables and see how many of them use *Zenith Carburetors* as standard equipment.



If you want to know why, send for copy of this book.

ZENITH-DETROIT CORPORATION

Manufacturer of

ZENITH CARBURETORS

DETROIT

New York

Chicago

Cleveland



THE LOWEST COST-RECORD BECOMES HIS YARDSTICK

Let your fleet owner check the operating cost of one truck against that of another of same capacity. Let him openly credit the better record to the better driver.

He will see costs-per-mile tend *downward* to one common level.

Veeder

HUB-ODOMETERS

make for careful truck management in a perfectly simple way.

The owner knows what he spends on each truck. The Odometer tells what (mileage) he gets for it.

The valuable driver must *deliver value*.

REGULAR MODEL \$20.00

FORD TRUCK MODEL . . . \$15.00

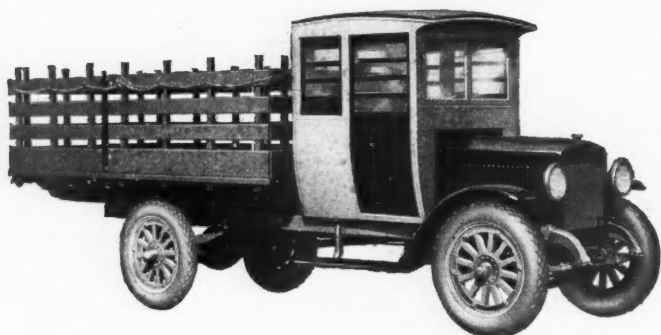
Informative circular on request

The Veeder Mfg. Co.
10 Sargeant Street Hartford, Conn.

Sales and Service Stations in

Atlanta, Ga.
Baltimore, Md.
Birmingham, Ala.
Boston, Mass.
Buffalo, N. Y.
Chicago, Ill.
Cincinnati, Ohio
Cleveland, Ohio
Denver, Colo.
Detroit, Mich.
Indianapolis, Ind.
Kansas City, Mo.
Los Angeles, Cal.
Montreal, Quebec

New Orleans, La.
New York, N. Y.
Philadelphia, Pa.
Pittsburgh, Pa.
Rochester, N. Y.
St. Louis, Mo.
St. Paul, Minn.
San Francisco, Cal.
Syracuse, N. Y.
Tacoma, Wash.
Toronto, Ont.
Washington, D. C.
—and other cities.



A Crackerjack One-Ton Model!

Today the one-ton truck is one of the country's best sellers. It's in demand everywhere.

Here's a crackerjack one tonner—a wonderful piece of merchandise.

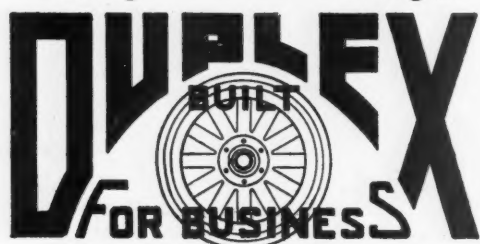
This powerful, well-balanced, rugged one-ton design will be a big money maker for money-making dealers.

Buda motor	Modine-Spirex radiator
Brown-Lipe clutch and transmission	132-inch wheelbase
Timken axles	33 x 5 Pneumatic cord truck tires

In production now. Prompt delivery. For big dealers and small dealers—for big towns or small towns—everybody everywhere can make money selling this remarkable one-ton job.

May we hear from you at once—today?

Duplex Truck Company
Lansing Michigan



TRUCKS

Require More Servicing Supplies and Materials Than Motor Cars

Running four times as many hours, traveling twice as many miles as the average motor car, and subjected to harder usage, the average commercial car wears out and consumes from two to three times as much material of all kinds as the average passenger car.

THE COMMERCIAL CAR JOURNAL

Reaches More Buyers Than Any Other Medium in This Field

The big trade circulation of the JOURNAL is composed of the majority of the worth-while buyers in the industry. These men read the JOURNAL to discover sources of supply and to locate salable products. They make many of their connections thru this book and consult it when they are in the market. That they buy from it is proven by the fact that the JOURNAL carries far more advertising than all its competitors combined.

The Commercial Car Journal

Chestnut and 56th Streets
Philadelphia

DURSTON

TRANSMISSIONS

For passenger cars and trucks up to one-ton capacity. Investigate their adaptability to your requirements.



DURSTON GEAR CORPORATION

29 Maltbie Street
SYRACUSE, N. Y.

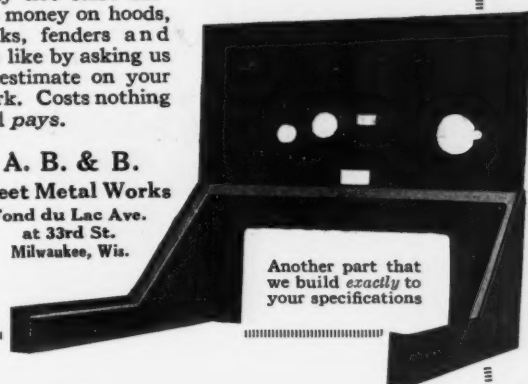
Specification Service on Sheet-Metal Steel Parts

Truck manufacturers who avail themselves of our specification service find that their production costs on sheet-metal parts are lowered.

Our big volume production, backed by the most modern machinery for producing sheet-metal parts, cuts tremendous slices from die costs, and time and labor in manufacture. It gives you the benefit of the best and most economical way of making these parts.

Why not start saving money on hoods, tanks, fenders and the like by asking us to estimate on your work. Costs nothing and pays.

A. B. & B.
Sheet Metal Works
Fond du Lac Ave.
at 33rd St.
Milwaukee, Wis.



Another part that we build *exactly* to your specifications

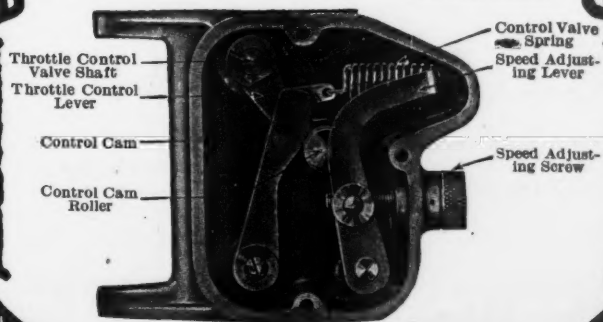
6000 in Actual Use Prove Results

TODAY more than 65,000 Handy Governors are in use and their number is constantly increasing.

For Handy Governors are not only the simplest and most efficient but also the only governor that requires absolutely no attention—not even oiling—after installation.

Make sure that the governor for your truck is trouble proof by specifying that it be a Handy.

HANDY GOVERNOR CORPORATION
3021 Wabash Ave. Detroit, Mich.



HANDY GOVERNOR

A Selling Demonstration of the

ARCHER

STEEL DUMP BODY AND HAND HOIST

Show your customer how, with this easy-to-operate outfit, one man readily dumps the entire load. Such a demonstration will sell the buyer, because he will see with his own eyes the Archer's superior time and labor-saving features.

For road builders, coal concerns, grain merchants—for every business that needs efficient dumping equipment. Write for special dealer proposition.

Our Standard Dump Outfits Fit All Makes of Trucks From 1 Ton to 5 Ton Capacity

ARCHER IRON WORKS
2450 West 34th Place, Chicago



Ford Dealers Are "Cashing in" on Field Quality and Price

Field quality, design, construction and finish offer you a nationally known product that insures owner satisfaction and builds business.

Every Field Body is constructed of best selected hardwoods, thoroughly ironed. Field originated the standardized commercial body built with interchangeable units. All Field Bodies are built to knock down and crate in small space, insuring low freight charges and storage space.

FIELD LOW PRICE has multiplied the Ford dealer's business. The unequaled manufacturing facilities of the large Field

plant, its vast volume of production and small margin of profits alone make possible the low price on this complete, high quality line of ton-truck and commercial bodies.

You will agree later that your initial order for one or more Field Bodies opens the way to multiplied business, a larger circle of satisfied customers and greater profits in your first cost and from your increased turn-over.

WHY NOT "CASH-IN" ON FIELD SERVICE AND SATISFACTION?

For YOUR Profit—Order Today!

FIELD BODY CORPORATION

OWOSSO, MICH., U. S. A.

For
Truck or Motor Bus
Investigate

TORBENSEN AXLES

The **TORBENSEN AXLE CO.**
CLEVELAND, OHIO

Six Big Dealer Features

1. A company whose success is assured
 2. A truck that made good in mud
 3. Bigger dealer discounts
 4. One dealer to a county
 5. Dealing direct with factory
 6. Sales Service Scout help
- and the big EXTRA!

Send for the New Bessemer Sales Plan folder.
Gives *all* details.

Bessemer Motor Truck Co.

Motor Truck Division
Bessemer-American Motors Corporation
PHILADELPHIA, PA.

The Bessemer Tandem Duplex Drive Transmits Power with 97% Efficiency

BESSEMER MOTOR TRUCKS

The Truck that Made Good in MUD



A Signal to You!

The appearance of this Symbol in a manufacturer's advertisement is a signal to you that the manufacturer has placed complete buying information about his product in the current issue of the **CHILTON AUTOMOBILE DIRECTORY** for your reference.

Watch for the Signal. Turn direct to the standard reference book of the trade and avoid lengthy correspondence.

Chilton Automobile Directory

(Published Quarterly)

Chestnut and 56th Streets

Philadelphia, Pa.

Ⓢ THIS SYMBOL IN ANY ADVERTISEMENT MEANS: SEE "CHILTON
AUTOMOBILE DIRECTORY" FOR COMPLETE BUYING INFORMATION Ⓢ



Improved Construction

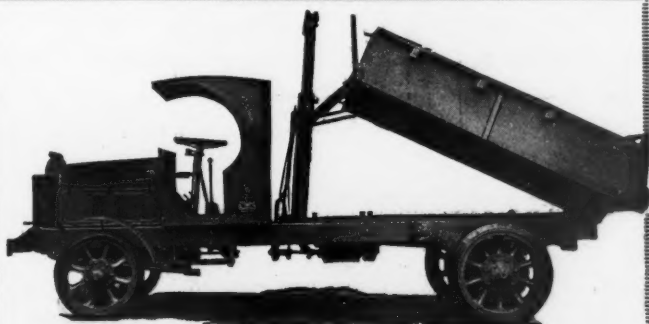
The methods that Firestone employs in building truck tires are the latest and most improved developments in this field.

Difficult processes such as double gum-dipping, air-bag cure and blending and tempering of rubber have been made to yield extra mileage and greater reliability of service to users of Firestone Truck Type Cords.

Most Miles per Dollar

Firestone

TRUCK TYPE CORDS



STEWART'S STEEL DUMP BODIES

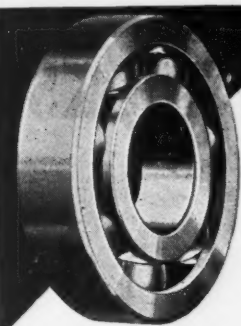
Built to withstand hard usage. Bodies made to give your truck additional service.

Standard and Special Steel Bodies. Let us quote on your requirements.

THE STEWART IRON WORKS CO.
COVINGTON, KENTUCKY

Manufacturers of

STEEL BODIES CABS
BUMPERS DASHES
RADIATOR GUARDS



When Friction Disappears

Not only electric trucks, but machines of every kind give better and longer service as friction disappears.

STROM Ball Bearings reduce friction to the vanishing point, because they are made by an organization built for precision, scientific in principle and practice with a singleness of purpose possible only where specialization rules.

They are made to standard dimensions and as perfectly adapted for replacement as for new work—

"Wherever a Shaft Turns"

U. S. BALL BEARING MFG. CO.
(Conrad Patent Licensee)



(2412)

Pierce-Arrow Trucks pioneered the worm gear drive in America. That was twelve years ago.

Pierce-Arrow also is pioneering the Dual-Valve engine—the greatest single stride in truck design in recent years.

The Pierce-Arrow Motor Car Co.
BUFFALO, NEW YORK

CHASSIS SIZES

2-ton	4-ton	6-ton
3-ton	5-ton	7½-ton

Pierce Arrow

HEAVY DUTY
MOTOR TRUCKS

Rowe TRUCKS

THE PIONEER



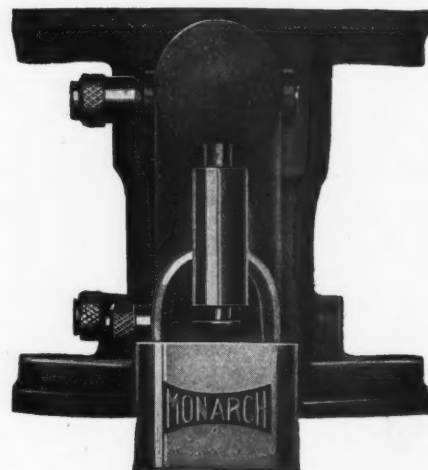
Complete Line Worm-Driven Trucks
¾ to 6 Ton Capacity

ROWE COMMERCIAL BODIES
BODIES OF UNUSUAL CONSTRUCTION

Valuable Territory Open to Dealers
Write for Catalogue

ROWE MOTOR MANUFACTURING CO.
LANCASTER, PA.

THE MODEL G

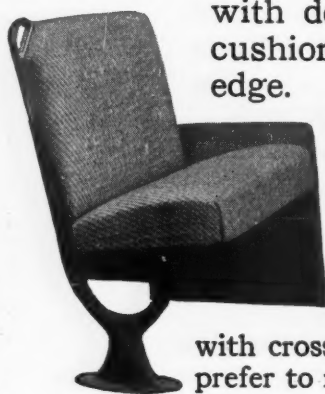


THE PIONEER Gas Velocity Governor

175,000 in Use All Over the World

MONARCH GOVERNOR CO.
DETROIT, MICH.

BUS SEATS



with deep, comfortable cushions with spring edge.

Bronze corner grip-handle for standees.

Offset back, giving additional aisle room.

Equip your buses with cross-seats. Passengers prefer to ride facing forward.

Write for Cuts and Prices of Seats in Rattan
Genuine or Imitation Leather
Also Prices on Rattan Car Seat Webbing

Heywood-Wakefield Company

Factory: Wakefield, Mass.

SALES OFFICES:

Heywood-Wakefield Co. 516 West 34th St. New York	E. F. Boyle Monadnock Bldg., San Francisco, Cal.	Heywood-Wakefield Co. 1415 Michigan Ave. Chicago, Ill.	F. N. Grigg 630 Louisiana Ave. Washington, D. C.
Railway and Power Engineering Corp. Toronto and Montreal		G. F. Cotter Supply Co. Houston, Texas	

BUILDERS OF BETTER BUS BODIES

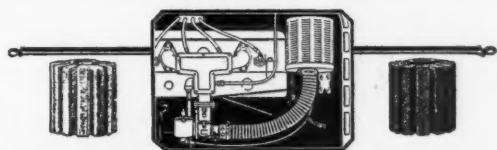


Type DX bus body—32 passenger—Inside width, 78"—Inside height, 71"—32" cross-seats, allowing 14" aisle in the center. Rear seat is full width with longitudinal seats over wheel-housings. DEALERS WANTED.

Bus Bodies, any size, any type, for any chassis. Our Bus Bodies represent REAL QUALITY at RIGHT PRICES and mean SATISFACTION to dealers and users.

GROVE CITY BODY & MFG. CO.

Established 1867
GROVE CITY, PA.

White Before
ServiceDirty After
Service

STAYNEW FILTER

ROAD DUST

The Greatest Enemy to Motors

It is a well-known fact that road dust entering thru the carburetor air intake to the motor makes the oil gritty, thereby causing excessive wear on the pistons, piston rings, cylinder walls and bearings, making it noisy and inefficient, which results in direct loss of power, increased fuel consumption and, in most cases, reboring of cylinders and fitting of new pistons and piston rings is necessary.

Eliminate this trouble and expense by installing a Staynew Filter, which will save the cost of installation many times.

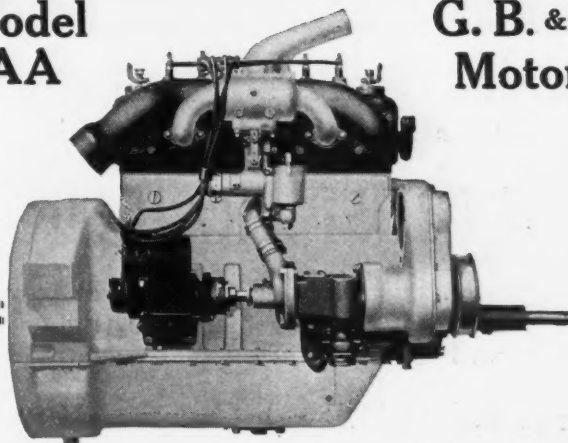
Complete sizes and fittings for all makes of cars and trucks; simple to install and requires no attention.

*Exclusive territory to live dealers
and distributors. Write for details.*

STAYNEW FILTER CORP.
Rochester, N. Y.

Model AA

G. B. & S. Motor



Priced Low for Quick Sale

This Model AA G. B. & S. replaces Continental Motor N-3 $\frac{3}{4}$ " x 5"—a size very much in demand.

Without any change of fitting dimensions, truck manufacturers and dealers can install this famous quality G. B. & S. engine on any truck that accommodates the Continental model.

Has aluminum base, high class workmanship throughout. Built to withstand severest truck service.

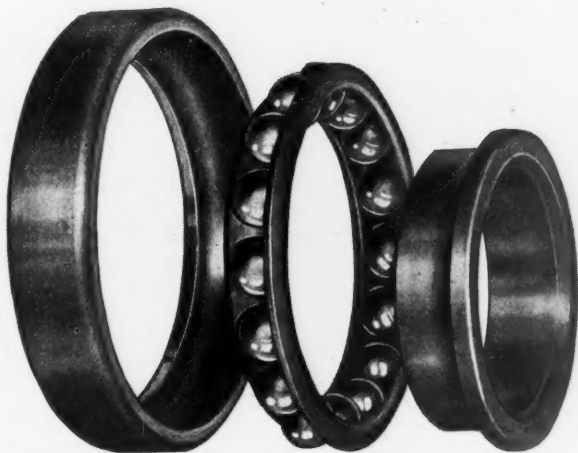
A number of Model S G. B. & S. Motors also available at exceptionally reasonable prices.

Wire Your Requirements

Golden, Belknap & Swartz Co., Detroit, Mich.

G. B. & S. MOTORS

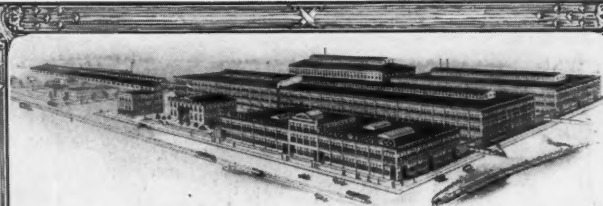
The Bearings Company of America



Manufacturers of Angular Contact Radial Bearings, Angular Contact Thrust Bearings, Thrust Ball Bearings. Bearings made to your blueprints and requirements. Your present bearing sizes duplicated.

The Bearings Company of America
Lancaster, Penna.

DETROIT, MICH., OFFICE: 1012 FORD BLDG.



The U. S. Dealer in Indianapolis Says:

"The satisfactory performance of U. S. Trucks in the hands of the users convinced us that U. S. was a good company to represent.

"There is easily 20% more value in U. S. Trucks than in other trucks selling for the same price.

"We have sold several of the leads handed to us by the factory this year, and have seen the benefit of the U. S. system of factory sales co-operation, which means everything to the dealer."

PROFIT BY INVESTIGATING THE U. S. SALES FRANCHISE

A U. S. Truck for Every Hauling Need

Capacity	PRICES	Model
1 $\frac{1}{4}$ Ton	\$1875	U
1 $\frac{1}{2}$ Ton	2225	N
1 $\frac{1}{2}$ -2 Ton	2525	NW23
2 $\frac{1}{2}$ -3 Ton	3375	R
3 $\frac{1}{2}$ -4 Ton	4075	S
4-5 Ton	4500	S-Special
5-7 Ton	5000	T

Prices f.o.b. Factory, Plus War Tax

Write for Your Copy of Our Folder, "How to Start a Profitable and Permanent Truck Business"

THE UNITED STATES MOTOR TRUCK CO., INC.

Established 1909

Cincinnati, Ohio

Factory: Covington, Ky.

United States MOTOR TRUCK

"GOOD AS THE NAME"

Joint Dealers' Agencies
at desirable points are open for

DETROIT TRAILERS

Reversible, Non-Reversible, Semi-Pole, Dropped Frame, Industrial and Passenger Car—

Mansfield Steel Corporation

Line of Gravity Dump Bodies, Flat-Bottom Bodies with Power or Hand Hoist; Trailer or Towing Attachments for Trucks; Radiator Guards and Front Bumpers (listed as standard by Underwriters' Laboratories) and other desirable and good selling devices. Address either:

Detroit Trailer Company
or

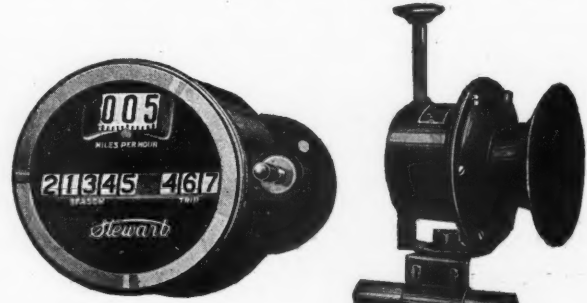
Mansfield Steel Corporation

Both Located at

954 East Milwaukee Ave., DETROIT, MICH.

Our mammoth shops are equipped to handle nearly everything in the transportation line

For Trucks

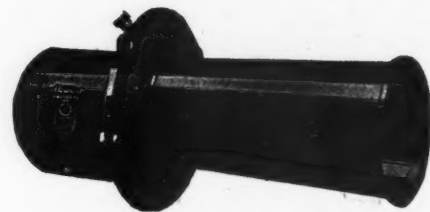


Model 131-Y, \$25.00

Model 76-B, Mileage Recorder only, \$18.00

Model 114 - \$5.00

Model 151, Slanting Plunger - \$3.50



Model 163 - - \$7.50

Model 186 - - \$10.00

STEWART-WARNER SPEEDOMETER CORP.
CHICAGO, U. S. A.

COUNTERBALANCED PARK CRANKSHAFTS

Patented July 10, 1917



We have
shipped 142,105
Counterbalanced
Crankshafts up to
April 30, 1923.

**THE PARK
DROP FORGE
COMPANY**

Cleveland, Ohio

The SELDEN LINE comprises a series of light and heavy-duty units of transportation—each powerfully constructed to give highly efficient and economical service in the particular commercial pursuit for which it is intended.



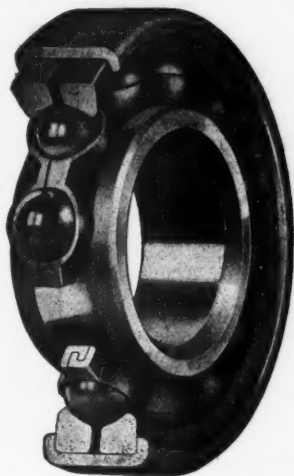
WRITE for Complete Information

SELDEN TRUCK CORPORATION
ROCHESTER, N. Y., U. S. A.

Selden Motor Trucks

Schatz
"UNIVERSAL"
Registered Annular U.S. Pat. Off.
BALL BEARING

A large number of large balls operate in races scientifically formed to support them and maintain perfect alignment. 50% thrust capacity in either direction.



The Federal Bearings Co.
 INCORPORATED

Poughkeepsie
 NEW YORK

Universal Joints
That Give Real Service

Electrically Heat Treated Nickel Steel Tube Makes

- A lighter weight shaft
- A greater strength shaft
- A non-whipping shaft

Flexible Fabric Disc Joint Means

- Cushioned power impulses
- Longer life to gears and bearings
- Minimum replacement costs
- No need of service attention

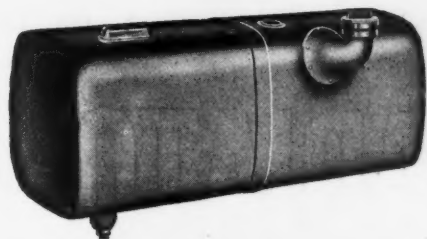
SNEAD & CO. Jersey City, N. J.



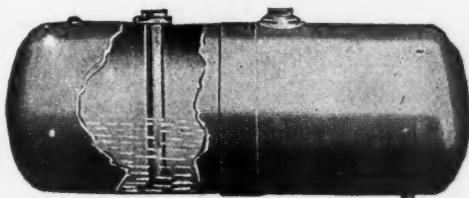
SNEAD
 CUSHION DRIVE

GAS TANKS

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SQUARE
 ROUND

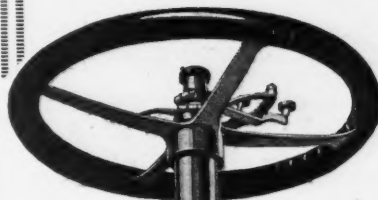


ALL SIZES — NEW BOOKLET

L
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A
K
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S

JANNEY-STEINMETZ CO.
 PHILADELPHIA

Ask the Mechanic—
He Knows



Mechanics know that many truck-steering gears are mighty hard to adjust. This is not the case with

Always Adjustable

WOHLRAB

Steering Gear

Any mechanic can quickly and easily make any required adjustment on a Wohlrab—which is one reason that Wohlrab gears always steer easily, have no excess play and are a selling asset to any truck.

Get acquainted with this easily repaired, inspected and adjusted gear. Write for a catalog today.

Wohlrab Gear Company
 RACINE WISCONSIN

WATCH

This Space
for
a New Type
**ALL-WEATHER
CAB**

A Salable and Profitable
Cab to Recommend

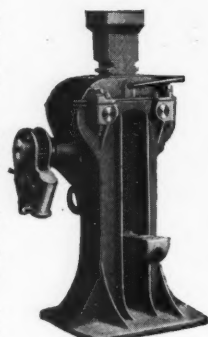
Cabs for Motor Trucks

SHEET STEEL PRODUCTS COMPANY
MICHIGAN CITY, INDIANA



Sell the
**Jack That Will be
Good Years From Now**

Customers are tired buying jacks which go bad. Too often they have bought them and found the mechanism fail.



Model No. 21-A
10 Ton Capacity

REES

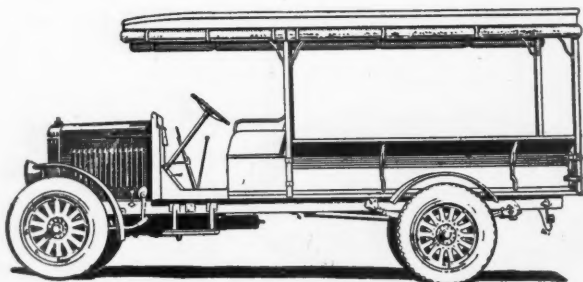
You'll make more money selling Rees *Double Worm Drive Jack*. A construction which has only four parts, none of which can possibly get out of order. All forces evenly balanced, no end thrust—no delicate springs or ratchets.



No. 25-A

We supply also window and counter displays, circular letters and folders. But the best salesman is the jack itself and its mechanism—it sells itself. Start selling the complete line and make real jack profits.

Rees Manufacturing Co.
Pittsburgh, Pa.



KISSEL'S TON EXPRESS

THE Ton Express—built for the retailer, merchant, wholesaler, farmer—is a regular One-Ton Kissel Truck in which strength and durability are combined to make it the best value on the market, irrespective of price.

\$1585

Chassis—Standard
Equipped

\$1985

For chassis and body completely equipped with worm-drive rear axle, electric lighting and starter, cord tires, express body and top—completely painted. Prices F.O.B. Hartford, Wisconsin.

KISSEL
Motor Trucks
5 Sizes

The complete line of Kissel Trucks creates a sales opportunity that makes the Kissel Franchise in your territory doubly valuable. Also Special Road Builders' Truck, Hoppers, Measuring Boxes, Turntable, etc. Send for franchise details.

The Kissel Motor Car Co.

Hartford

Wisconsin

Originators of the ALL-YEAR Cab for Trucks

BUSH RADIATORS

**BUILT TO ENDURE
FOR
TRUCKS - BUSES**

BUSH MANUFACTURING CO.
HARTFORD, CONN.



Broad gauged, far visioned dealers are showing a preference for busses and trucks equipped with the new Waukesha Motor. Its assurance of high steady performance, adequate power reserve, and exceptionally low operating cost makes bus and truck sales easier and more positive. Further still, it delivers a satisfaction which quickly credits itself on these dealers' books in more good will and increased business.

Complete information on request

The WAUKESHA MOTOR COMPANY, Waukesha, Wisconsin

*Adds Years
to the Life of*

Your Light Delivery Truck Assembly

Only in the Columbia Single Reduction Bevel Gear Axle will you find those features of construction that will add years to the life of your light delivery, high-speed truck assembly.

The famous Columbia one-piece housing—pressed from a single piece of steel, and welded once—adds 50% greater torsional strength, *alone*.

Let us tell you the Columbia story in full. It will pay interested truck manufacturers to write for it to

The Columbia Axle Co. Cleveland, Ohio

COLUMBIA

SINGLE
REDUCTION

AXLES



Truckcrane

A Byers Truckcrane in your fleet pays its cost in a surprisingly short time and then keeps on piling up profits for you. The truck driver can operate it alone or with one helper, depending on conditions.



You can mount a Truckcrane on any 5 ton truck chassis that measures 9 feet 6 inches or more from rear of driver's seat to center of rear axle.

May we send you full particulars?

THE BYERS MACHINE COMPANY

155 Sycamore St.

Ravenna, Ohio

Write for names of users near you

LEE DUMP BODY

Dumps Without Power



**Saves 40% First Cost—
Cheaper to Maintain and Operate**

Lee Bodies use *no* hoist. They eliminate the needlessly complex construction which makes conventional dump bodies expensive in first cost and less dependable in service.

They save weight and expense of extra parts. And they increase daily tonnage. So simple, so practical and withal so inexpensive that they sell much easier. Of course there are mechanical reasons. Write for full information.

LEE TRAILER & BODY COMPANY

2343 South La Salle Street

Chicago, Ill., U. S. A.



No. 108
De Luxe

Hale and Kilburn Seats Increase Bus Revenue

MORE KNEE ROOM

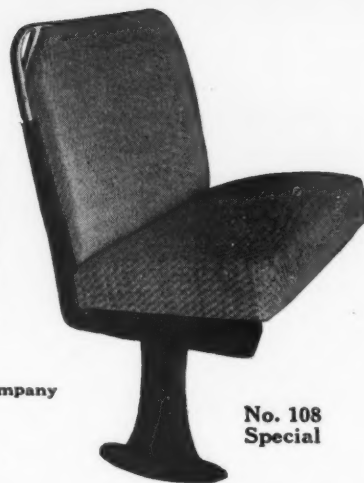
"H & K" Patented Space-Saving
Feature gives 1½ inches more space for
each passenger.

Specify "H & K" and get the best at no higher
price—possibly less.

Hale & Kilburn Corp.
Philadelphia

American Motor Body Company
Successors

Sales Offices: New York, Chicago, St. Louis, Atlanta, San Francisco



No. 108
Special



Serial 75 De Luxe Body

22, 26, 30 Passenger Capacity

The Last Word in Fine Body Building

Correct Design — Complete Appoint-
ments—Superb Finish

Built by Pioneers in the
Bus Body Field

Write for Descriptive Bulletin and Price List

Greenfield Bus Body Company

"Patterson Made"

210 Washington Ave. Greenfield, Ohio, U. S. A.

PRESSED STEEL FRAMES

The largest and best equipped
frame plant in the world

A-O SMITH CORPORATION

- MILWAUKEE -



Peerless Hoist. Showing Body Hitch
Worm and Gear, Machine Cut

The Only Logical Choice for Dealers

There is every reason why the Peerless is the logical hoist for you to sell. The discount is so liberal that your time is well paid for and a handsome profit is earned on every sale. The price appeals to your customers, as it is from one-third to one-half lower than the cost of other hoists. But profit and price would make little appeal if you did not conscientiously believe that the

Peerless Hand Hoist

was superior in mechanical perfection and operation to any other lifting apparatus made. Rest content! It is the only efficient hoist that can be attached to either steel or wood bodies. It is the only efficient hand hoist that sells at a moderate price. These are pretty strong reasons why you should consider its sales possibilities. An operator can hoist from one to four tons in from one to four minutes. What more could be required on speed?

You are getting calls for hoists and are often undecided as to which hoist to recommend. We'll tell you why the Peerless fills the bill every time. Will you let us?

Alsteel Bodies Guaranteed to Take Care of 100%
Overload Under Rough Usage

**The Auglaize
Hoist and Body Company**
New Bremen, Ohio



In the Front Ranks of Proved Units

Only proved units interest discriminating automotive engineers. Hence: the immediate adoption of Model B Universal Joints.

Oil is force fed to Oversize Bearings through a single opening by centrifugal action, insuring positive, convenient lubrication and dependable performance.

Bushings completely supported.

Details on Request

Blood-Bros. Machine Co.

PIONEER BUILDERS OF UNIVERSAL JOINTS

ALLEGAN MICHIGAN

F. SOMERS PETERSON CO.
San Francisco, California-Western Representative

Walter Electric Motor Trucks on Long Time Payments

The difference between the cost of operating gasoline and electric trucks allows you to make the following monthly payments out of the savings. Double shift 18 to 24 hours' service and unlimited mileage with Stone quick change battery cradles.

WALTER Electric	5-Year Plan	10-Year Plan
1/2 ton.....	\$ 36.00 per Mo.	\$22.67 per Mo.
1 ".....	49.50 " "	31.16 " "
2 ".....	69.75 " "	43.92 " "
3 ".....	83.25 " "	52.42 " "
5 ".....	101.25 " "	63.75 " "
7 ".....	108.00 " "	68.00 " "

No Cash in Advance

These prices are f. o. b. New York City, plus war tax and are subject to change without notice.

We can arrange payments giving ownership at any period from one day to ten (10) years. Electric trucks have a life of from 18 to 22 years from experience of users.

Electric Truck Transportation Corp.

25 West 43rd Street, New York, N. Y.

Cable "Electruck"

VANderbilt 5943



Rely on York Sheet Metal Parts

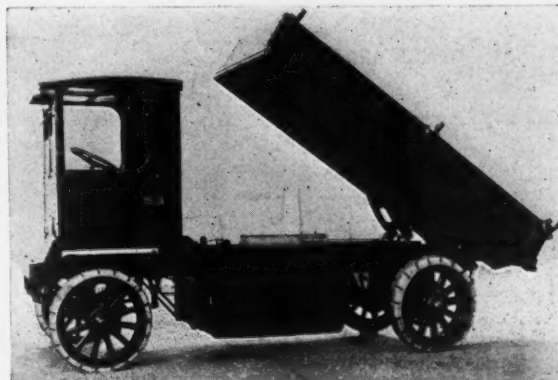
In closing the sale of your truck, the Sheet Metal Parts play a surprisingly large part —when they are York-made.

Not only are York Sheet Metal Parts rugged in construction and reasonably priced—they are uncommonly handsome in appearance. And that certainly helps make truck sales.

Do you need Fenders, Tanks, Hoods, Radiator Shields, Tool Boxes or Special Stampings? Ask us to quote you—this doesn't obligate you in the least.

York Corrugating Co.
York, Pa.

WALTER ELECTRIC TRUCKS 100% TRACTION



1/2, 1, 2, 3, 5 and 7 Ton Capacities

OVERSIZE ELECTRIC MOTOR
EFFICIENT FINAL DRIVE
AUTOMATIC LOCK DIFFERENTIAL
INCREASES
AVERAGE SPEED AND MILEAGE
DECREASES
COST OF OPERATION

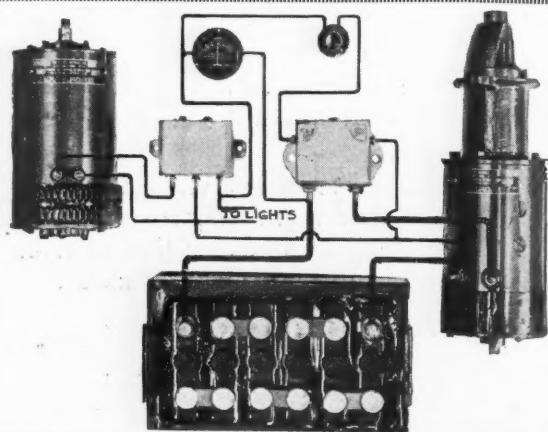
WALTER MOTOR TRUCK COMPANY
227 West 61st St. New York, N. Y.



ELECTRIC trucks engaged in city traffic, making frequent stops and no long runs are most generally equipped with open cabs.

Highland Model B cabs are built with steel panels that will not check and warp and are recommended for this service.

THE HIGHLAND BODY MFG. CO.
403 Elmwood Place CINCINNATI, OHIO



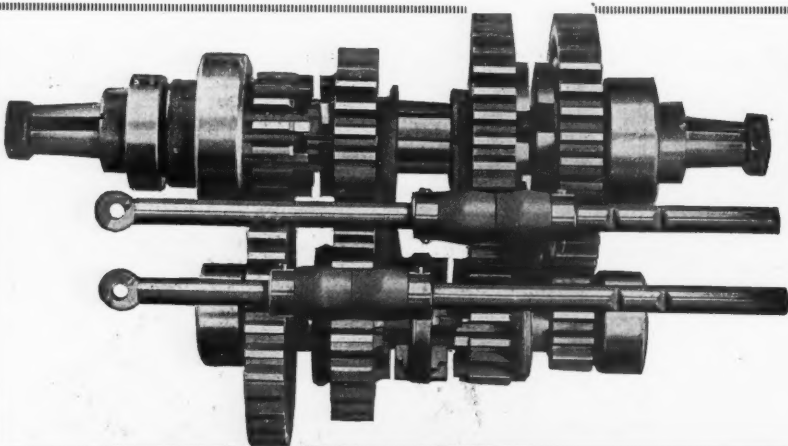
Makes Your Motorbus More Desirable

Every buyer will be more interested in your motorbus if it has a

LEECE-NEVILLE 12 VOLT ELECTRIC STARTING AND LIGHTING SYSTEM

The Compensator limits the charging rate of the Generator to the proper amount of current required by the storage battery, whether the lights are on or off. Prevents damage to battery thru overcharge when lights are not burning and causes generator output to rise to highest charging rate when lights are burning.

THE LEECE-NEVILLE COMPANY
CLEVELAND, OHIO



COTTA GEAR CO.

INDIVIDUAL CLUTCH TRANSMISSIONS

FOR
3½, 5 and 7 Ton Trucks

Notice the short, compact and husky construction.

Long bearings in the loose gears.

COTTA GEAR CO., Rockford, Ill.



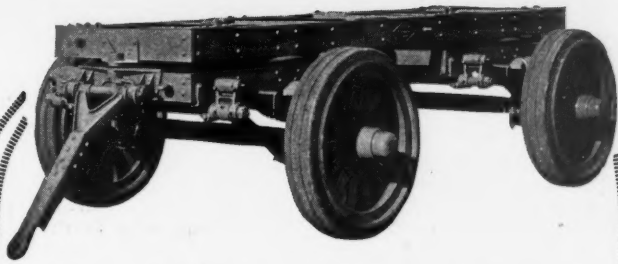
Loads 1500 ft. of Logs in 20 Minutes

Operated by one man, an AMOS LOG LOADER will load 1500 feet of logs on the chassis you sell.

Under favorable conditions, the Loader will load and securely bind the logs within 20 minutes.

DEALERS:
For Literature and Prices, Write

Amos Loader Company
Edinburg Indiana



A Better Trailer for Better Profits

The platform of this Fruehauf Four Wheel Trailer is carried on two reversible gears or trucks. Each truck carries its load on dead square axles—the simplest, most efficient construction ever designed for heavy haulage purposes.

This exclusive feature is one of many that enable you to sell Fruehauf Trailers for better than ordinary profits.

Get acquainted with the complete line of Fruehauf Trailers—and our extremely liberal distributor and dealer proposition. Write.

Fruehauf Trailer Company
10921 Harper Avenue Detroit, Mich.

FRUEHAUF TRAILERS

1867

1923



A 36x6 Dual S. A. E. METAL FELLOE TRUCK WHEEL ready for hub and tires.

Weight 160 Lbs.

How does this compare with the weight of wheels you are now using as standard on your trucks?

Further information gladly furnished upon request.

Hoopes, Bro. & Darlington, Inc.
WEST CHESTER, PA.

SIDE
SEAT
BODIES



CROSS
SEAT
BODIES

"BETTER BUILT" "BUS BODIES"

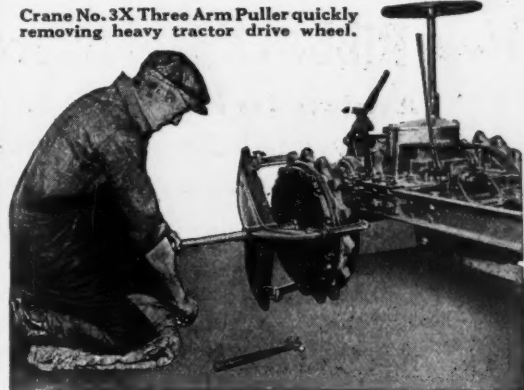
FIRST-QUALITY materials and workmanship are built into our sturdy, distinctive Bus Bodies. Quantity production of standardized units enables us to offer them at extremely moderate prices. You dealers will find these high-class, low-priced bodies powerful aids in closing bus sales.

*Complete Catalog and Prices
Gladly Sent on Request*

BUS BODY CORPORATION

Exclusive Bus Body Builders
Evansville Indiana, U. S. A.

Crane No. 3X Three Arm Puller quickly removing heavy tractor drive wheel.



For Extra Heavy Pulling

Rely on Crane No. 3X Three Arm Puller. It takes diameters up to 26"—and speedily removes heavy truck wheels, flywheels, gears, sprockets, collars, universal joint yokes, etc.

Note nickel-steel, case-hardened screw; abuse-proof semi-steel body and hook arms.

The busy service station simply cannot do without this high-grade, reasonably priced, time and labor saver.

Your jobber can supply you with the CRANE—the original pulling tool.

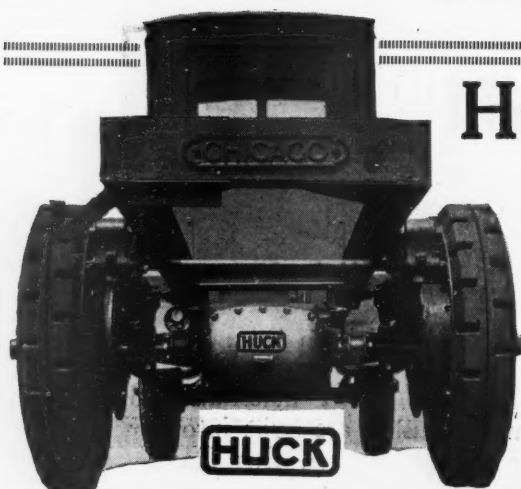
CRANE PULLER COMPANY

54 Lake Street

Arlington 74, Mass.

CRANE PULLER

The Original Pulling Tool



Huck Axle Entire Driving Mechanism a Complete Unit

Enclosed in the dust-proof axle housing, the entire driving mechanism of the Huck Rear Axle functions as a complete unit. This exclusive construction insures *positive alignment*, permits *perfect lubrication*—insuring long life—and provides 96% power transmission to the rear wheels.

This full floating double reduction rear axle made in 2½ to 3, 3½ and 5 ton capacities. Also designed for 30 to 35-passenger wide-track buses. Write for complete details.

EFFICIENT TRUCKS USE HUCK'S

HUCK AXLE CORP., 4640 West Harrison St., Chicago

The Bear Tractor

Write today regarding unassigned territory, and ask for catalog and distributor's and dealer's proposition

BEAR TRACTORS, INC., 5303 PARK PLACE, NEW YORK CITY

The Tractor that Delivers its Power to the Drawbar

A New Ribbed Panel Express Body

Added to Babcock Line

Very Roomy and Exceptionally Strong

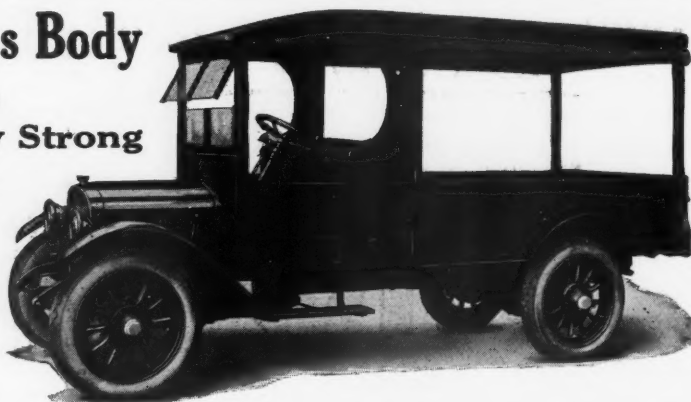
SPECIFICATIONS: Loading space, 96" x 56½" x 64" high. Width between Wheelhouses, 45"; Side Panels and Tail Gate, 19½" high, steel lined; Body heavily ironed; Metakloth Curtains side and rear, also back of Driver's Seat; Driver's Storm Curtains with Pyralin Lights; Fore Doors, Windshield, Rear Fenders and Splashes built in Body; Spring cushion Seat and full width Back; Roof, 12 oz. Oil Duck, leaded and painted.

H. H. BABCOCK COMPANY

WATERTOWN

Established 1845

NEW YORK



WYMAN-GORDON

The Crankshaft Makers

Worcester Division
WORCESTER, MASS.

Ingalls-Shepard Division
HARVEY, ILL.

COLUMBIAN

Partition Mounted
3 Point Supported

TRUCK TANKS

Exclusive and Extraordinary Features—Partition Mounted, Lowest Mounting, Less Deadweight. Three-Point Supported, No Twisting Strains, Less Upkeep Expense. Jointless Pipe Lines with Funnel Outlets. Welded-on Bucket Boxes. Removable and Adjustable Side Carrying Racks, Tank, Mounting, Pipe Lines and Bucket Box Welded into a Monometallic Unit. Correct Distribution of Load on Rear Axle. The Triumphant Climax to Truck Tank Construction.

COLUMBIAN

Monometallic

DUMP BEDS

Longitudinal sills formed from side and bottom members. All members electrically welded into monometallic unit. No rivets in entire assembly. Stronger, more rigid, longer service. Five models. Tail gate hinged top and bottom—double acting.

COLUMBIAN

Lightning Hoist

A simple device built upon sound engineering principles, giving power that enables a man to dump a five-ton load with ease and without power expense. Narrow and compact in construction. Mounts in 11 inch space.

THE BIG 3

of the

Truck Equipment Field

A letter, a telegram or a ring on the telephone will bring full data and way down prices on any one or all three.

COLUMBIAN STEEL TANK CO.

Tanks for the World

Established in 1894

1405-1625 West 12th St.

Kansas City, Mo.

Day-Elder Dealers Feel Fine About 1923!

They ought to! They are more than holding their own in every section of the country, simply because they are delivering more motor truck per dollar than ever before. They are standing pat on the argument of unbeatable value—and are *relying on comparison* to drive that argument home.

There is no reason why you can't build up a profitable business in Day-Elder trucks too. Our really better dealer contract will help you do it. Write for the details today. That will cost you nothing, but it may pay you well.

DAY-ELDER MOTORS CORPORATION
NEWARK NEW JERSEY

DAY-ELDER

WORM-DRIVE MOTOR TRUCKS

TRANSMISSIONS

Unit Power
and
Main Frame

CLUTCHES

Multiple Disc
and
Multiple Lever, Single Plate

CONTROLS

A Style and Capacity
for
Every Requirement



SYRACUSE, N. Y.

San Francisco

New York

Chicago

London, Eng.

Detroit

Flint FRONT AXLES

Capacities: 1000 Lbs. to 2 Tons

Made by Front Axle Specialists

Present-day competition will not permit skimping on the quality of truck front axles. If you make 1000 lbs. to 2 ton capacity jobs, put your front axle problems up to the Flint Motor Axle Company.

We specialize on quality front axles, within those capacities.

A modern drop-forge plant—special machinery—newest heat-treating equipment—thoroughly up-to-date metallurgical instruments—assure you quality front axles. And quantity production spells right prices and fast deliveries.

What are your requirements?

WE ALSO MAKE QUALITY FRONT AND REAR AXLES FOR PASSENGER CARS.
WE SPECIALIZE ON HUBS ALSO

FLINT MOTOR AXLE COMPANY
Flint, Michigan

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QUALITY

Piston Rings



CAPACITY

More than 12,000 Rings
Each Working Hour

Shipments of **QUALITY** Piston Rings, during the first four months of 1923, have broken all previous records.

1923	Shipments
January	1,946,498
February	2,067,273
March	2,273,714
April	Over 2,500,000

The Piston
RING COMPANY
Muskegon, Michigan

1923 APRIL 1923
Sun Mon Tue Wed Thu Fri Sat
over 2,500,000
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30

1923 MARCH 1923
Sun Mon Tue Wed Thu Fri Sat
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31

1923 FEBRUARY 1923
Sun Mon Tue Wed Thu Fri Sat
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28

1923 JANUARY 1923
Sun Mon Tue Wed Thu Fri Sat
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31

IT'S THE DEMAND

Ⓞ THIS SYMBOL IN ANY ADVERTISEMENT MEANS: SEE "CHILTON AUTOMOBILE DIRECTORY" FOR COMPLETE BUYING INFORMATION Ⓞ

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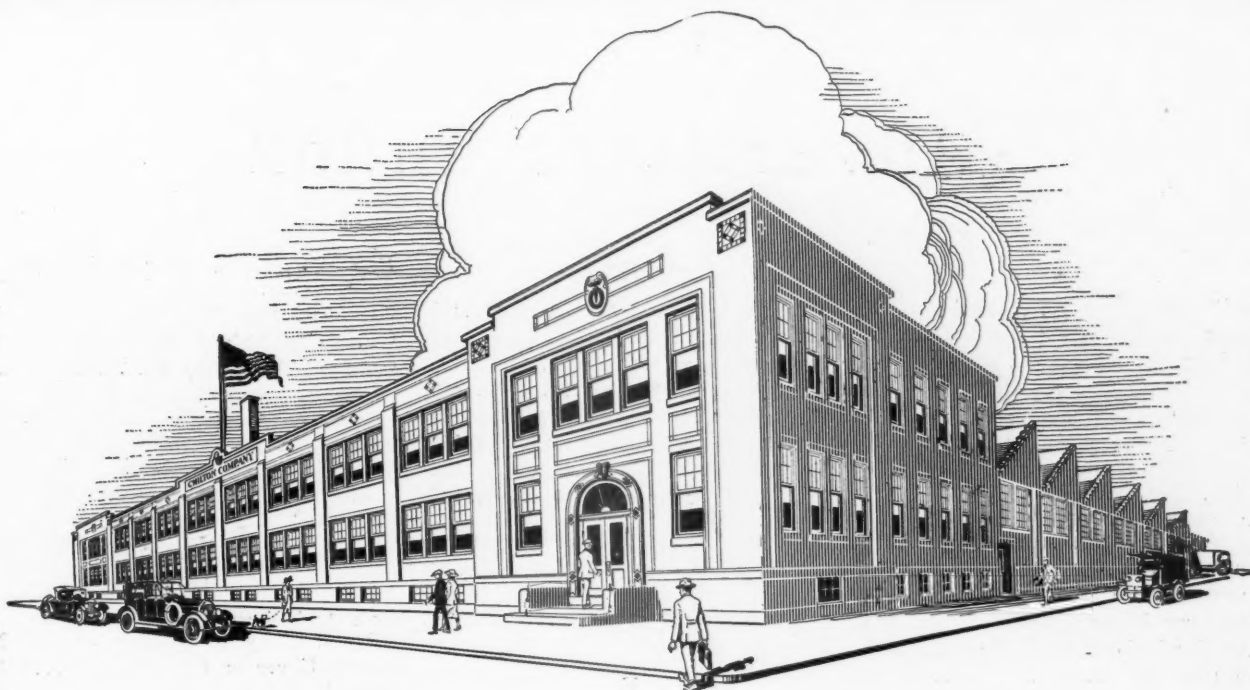
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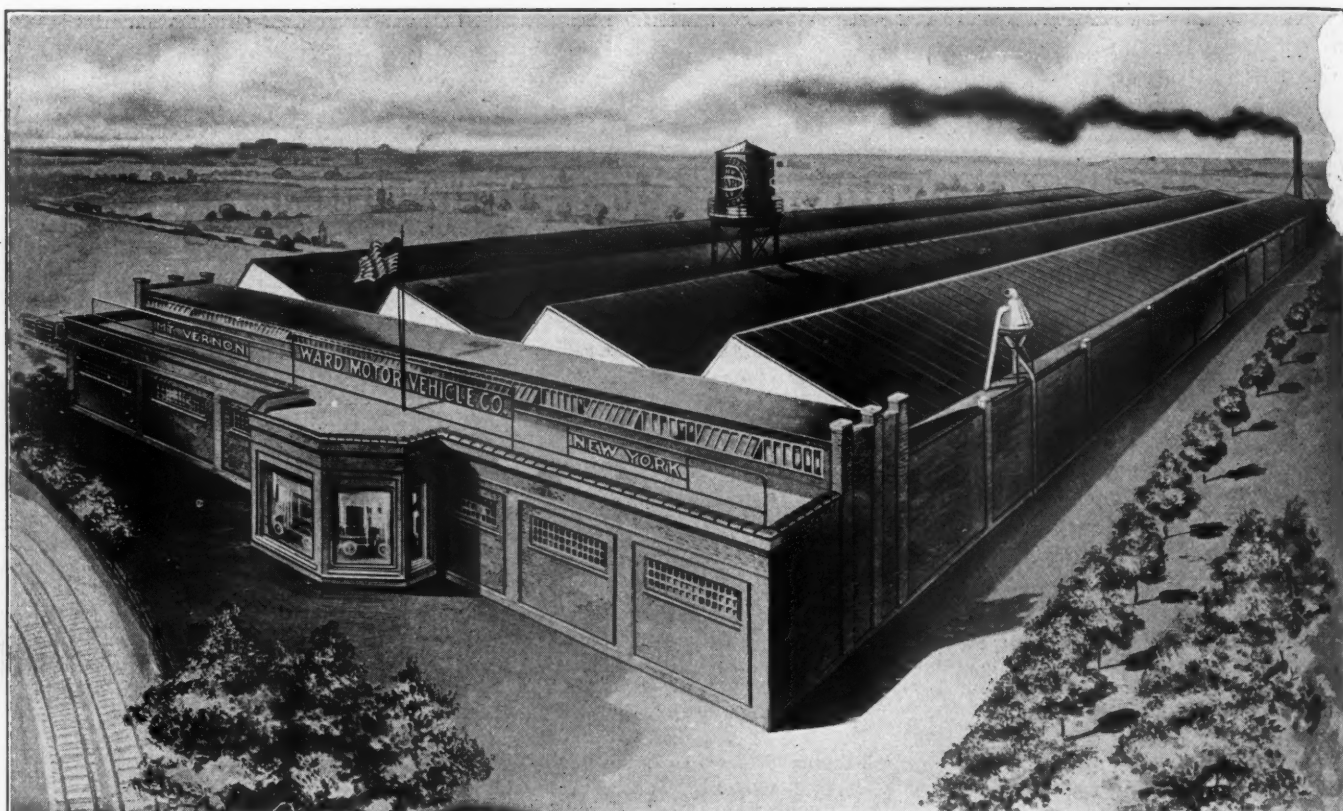
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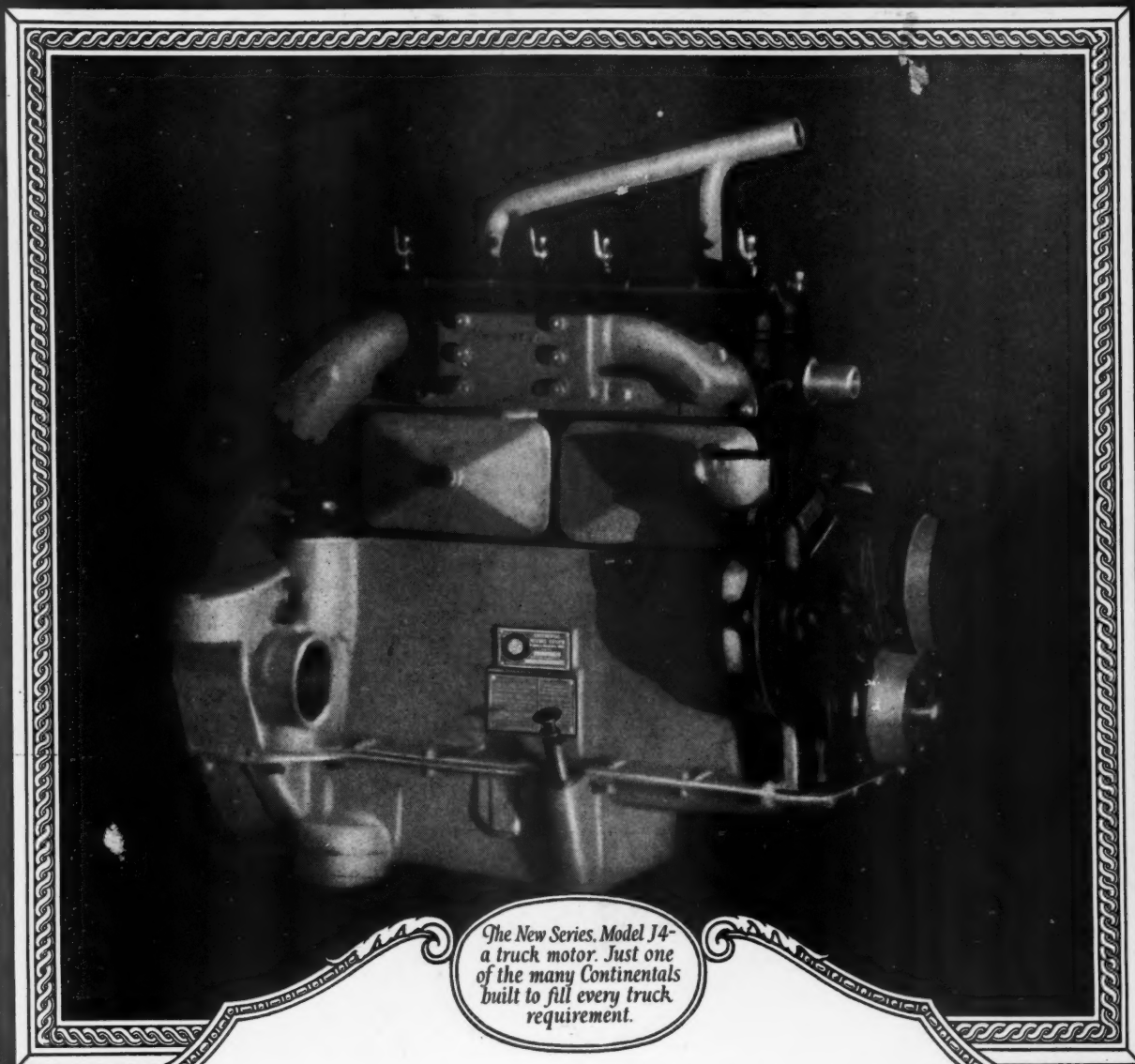
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